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The need for unambiguous communication among all nations is critical in the world today. In the field of Foreign Military Sales this need is most prevalent in the development of support documents, from FMS Procedure Manuals to Technical Orders, that must be clearly understood by both the United States and the allied nations. Experience has shown that narrative English is not meeting this need. This thesis demonstrates a better way to write International Logistics Documents. Actual logistics documents were used as the basis for testing. United States and allied personnel (representing over twelve countries) assisted in obtaining the thesis conclusions.

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A FOUNDATION FOR AN INTERNATIONAL  
LOGISTICS LANGUAGE

Colonel Husam K. Abo Ghazaleh, RJAF  
Mr. Ardel E. Nelson, GS-13

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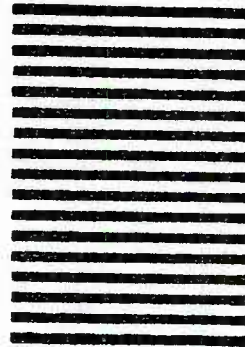
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A FOUNDATION FOR AN INTERNATIONAL  
LOGISTICS LANGUAGE

A Thesis

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Logistics Management

By

Husam Abo Ghazaleh, Dip. Aero. Eng.  
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June 1980

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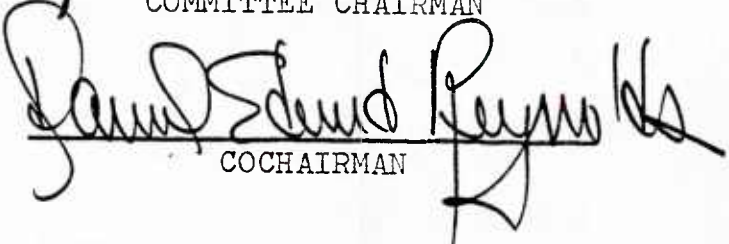
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## CHAPTER I

### INTRODUCTION

Logistics is viewed as "an ancient art and an emerging science[22:18]." The mixture of art and science varies with the area of logistics in question and its relative stage of development.

The word logistics was first used by the Romans and the Byzantines, who gave the title "Logista" to military administrative officials. One of the first serious attempts to develop a precise definition for logistics, and to establish the role of logistics in warfare, was made by Baron Antoine Henri Jomini. He divided the art of warfare into five branches: strategy, grand tactics, logistics, engineering and minor tactics (11:2.97-2.98).

The last thirty years have seen considerable attention paid to the development of an accurate understanding and definition of logistics. The Society of Logistics Engineers (22:19) calls logistics both an art and a science at the same time:

Logistics is the art and science of management, engineering, and technical activities concerned with requirements, design, and supplying and maintaining resources to support objectives, plans, and operations.

The Air Force Logistics doctrine concurs with defining logistics as both an art and a science (11:2.99).



Logistics is also considered by many as a recognized science. For example, Webster defines it thus:

Logistics: . . . military science in its planning and handling and implementation of personnel (as in classification, movement, evacuation) and material (as in production, distribution, maintenance) and facilities (as in construction, operation, distribution) and other related factors[39:1331].

Whether science, or a blend of art and science, logistics today is recognized as a valid and important element in the carrying out of both military and business management tasks, taking its place alongside strategy and tactics. As one text puts it:

The three fundamental elements that provide military capability or potential are strategy, tactics and logistics. All three must be adequately provided if a military organization is to be successful. Logistics is the source of power; the resource which permit tactics to be employed to accomplish the goals of strategy. Logistics is the creation and sustaining of military capability to effectively serve our National objective[11:2.12-2.13].

Today, the Department of Defense (DoD) and the United States Air Force (USAF) face a challenge of unprecedented magnitude in the area of logistics. Some of the factors contributing to this challenge are:

1. The diversity of weapon systems and equipment that are either in the inventory or in the developmental stages.

2. The number of aircraft and other systems that must be supported presently and in the future.

3. The number of "customers" that the logistics system has to deal with.

4. The increasing sophistication and complexity of weapon systems coupled with the ever increasing demand for better and faster support.

All of these factors combine to make the U.S. DoD's logistics mission one of the largest and most expensive of its many functions.

An increasingly important part of the logistics business of the United States Department of Defense is the support provided to the military services of other countries. Tracing its current history from the "Lend-Lease" policies of the Roosevelt administration in World War II, almost every succeeding year has seen an increase in the size and scope of this "International Logistics" effort. Changes in administration, program changes, a shift from the "free" Grant Aid supplies, to our war impoverished allies and developing nations to the "pay-as-you-go" Foreign Military Sales portion of the Security Assistance Program--all, regardless of intent, have taken place with little impact on the continual growth of international logistics (9:64-70). By 1979 the USAF's portion of this program dealt with every aspect of logistics from routine supply of simple spare parts, to major weapon system acquisitions with total dollar values in the billions of dollars. Specific growth of the Air Force

effort in international logistics is shown in Table 1 and Figure 1.

TABLE 1  
OVERALL GROWTH OF USAF FMS CASES WITH A  
VALUE GREATER THAN \$100,000  
FY 1968-1978\*

Year	No. of Cases	Year	No. of Cases
1968	159	1974	389
1969	155	1975	375
1970	192	1976	451
1971	350	1977	409
1972	270	1978	461
1973	284		

\*AFLC HO 51.NH5C Data System 14 July 1979

By 1979, the actual number of aircraft being supported in allied air forces exceeded those supported in USAF (30).

Each of the actions needed to establish and continue the support to the allied nations required multiple transactions. Each transaction involved communication.

Due to the complexity of logistics itself, combined with international considerations, this communication involved a variety of types of documentation at varying levels of difficulty. Beginning with the basic international agreements expressed in Memorandums of

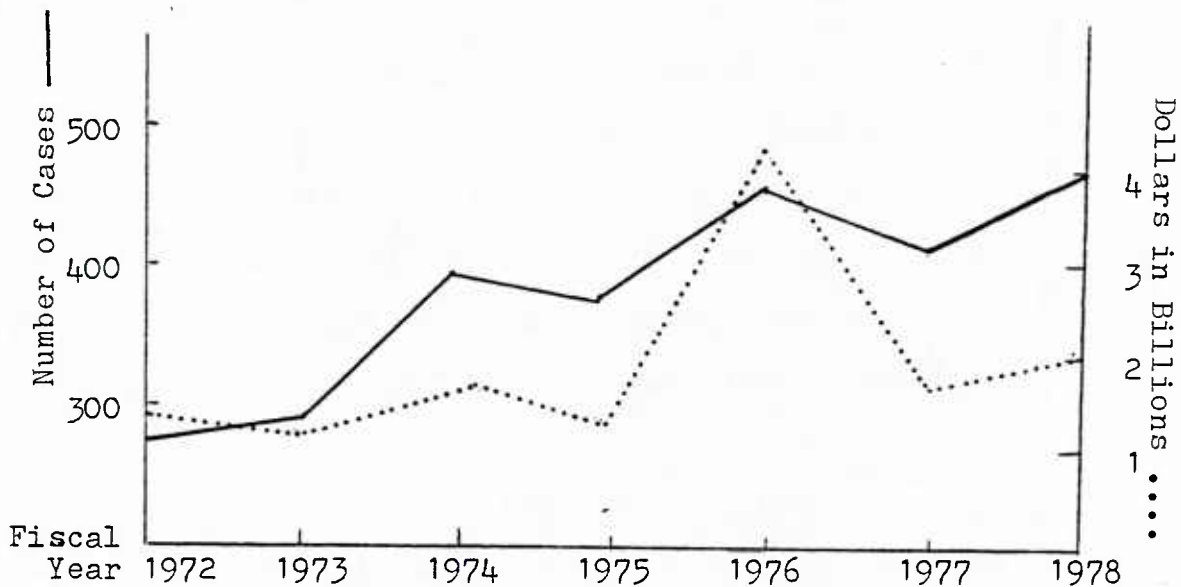


Fig. 1. Cases Greater Than \$100,000 and Total Dollars, All Cases, FY 1972-1978. Source: AFLC HO 51.NH5C Data System 14 July 1979.

Understanding and Letters of Offer and Acceptance, and continuing through the increasingly detailed and technically complex financial reports, requisitioning guidance, status reports and detailed procedures, each document represents an effort to communicate. Some of these documents, in turn, created a need for, or were intended to cause, other communications/documents to enter the channel. These included forms, technical orders, procedures and policy statements, automated system interfaces and outputs, all in an ever increasing number and level of complexity. By 1979, the Air Force Logistics Command alone employed some four thousand people to manage and support this effort (24).

The area of international logistics shares the same functions, problems, and expectations as that of U.S. Department of Defense logistics. It has, however, certain dimensions peculiar to itself. These dimensions add to the complexity of international logistics planning, programming and implementation and therefore require further study and analysis.

In international logistics, USAF has to deal with many different nations. Each nation has its own peculiar environment. Understanding the different elements that constitute this environment contributes to the continued friendly cooperation and the spirit of good will. Cooperation is important for the U.S. and its friends and allies in logistic support, in establishing and maintaining a standard of support that is acceptable to all parties.

The different cultures, languages, disciplines, and technological backgrounds are areas that must be considered. Unfortunately there is not a single rule of thumb that will apply to all these countries at all times. Logisticians in both USAF and the allied countries must be aware of cultural differences and levels at an early stage in their relationship. A mutual understanding of the basics, whether they are common or different, will greatly assist in the execution of logistic support. The necessity of attaining this understanding has been stated

not only in various studies but expressed as a goal (albeit in more limited terms) by the U.S. Congress (10:34,35; 19:2-7).

Communication is the central core used to implement the various logistics transactions. Lack of clear communication, or ambiguous communication, will, as in any business situation, ultimately result in loss of time, money and effort (17:iii). Unfortunately, as a review of the area, or discussions with managers in international logistics demonstrate (32), such misunderstandings have occurred far too often. Several specific instances will be discussed later in the Literature Review.

#### Statement of the Problem

The use of conventional, narrative English is causing difficulties in international logistics support. The problem is the lack of correct understanding of the meaning of the English terms and narratives both in and out of context. This problem is occurring at all levels of documentation, from the initial Memorandums of Understanding and Letters of Offer and Acceptance (DD Forms 1513) down through, and including, Technical Orders and Job Instructions. The importance of the problem is increased by the fact that these misunderstandings and misinterpretations are occurring, not only among individuals, but also among nations.



### Scope

As noted above, there are many types of international logistics documents and communications, each with its attendant level of technical and interpretational difficulty.

This thesis concentrates on the underlying communication principles common to these documents. A systems view has been taken. The problems with each of the various documents were viewed, not as independent in their own right, but as multiple symptoms of an underlying, common communications problem.

The scope, therefore, is restricted to the proposal of a foundation that can be used to develop a truly international logistics language to resolve this basic problem. The importance of this restriction is critical in understanding that the thesis does not propose to develop a complete, ready-to-use tool, but only the foundation for the further development of such a tool.

That foundation will be sought in two specific approaches to communication.

These approaches are briefly set forward here and developed in more detail in Chapter II and Appendicies A and B.

The first approach is based on advances made in the past few years in the development of automated data systems. One of the critical problems experienced in

systems development has been the adequate communication of system user's needs to the systems designer/developer. The most successful solution to the problem has been in the use of a technique known as "structured analysis." This technique combines several simple tools to produce documents that are non-ambiguous, non-redundant, maintainable, and far more accurate than any produced in the past. The tools used are:

1. A picture, or diagram, (called a Data Flow Diagram or DFD) that presents a visual overview of the procedure/process that the document covers.
2. A detailed narrative, of the processes shown on the overview diagrams, written in a special restricted format known as "structured English."
3. A dictionary that defines each term used, in both diagrams and narrative, to guarantee common understanding.

The second approach is based on recent development in industrial communications by international corporations. Some of these firms face similar problems to the DoD in that they are involved in the ongoing distribution, maintenance, and service of equipment in the international market place. A break through in communications in this area was made by the Caterpillar Tractor Company in the development of "controlled English." This is a special version of the English language that:

1. Uses a restricted, defined vocabulary of eight hundred to twelve hundred words, plus technical terms, in which all manuals are written.

2. Uses simplified grammar and syntax to further reduce ambiguity and clarify meaning.

### Research Objective

The objective of this study is to determine if a basis and foundation for an international logistics language, including grammar, syntax, and vocabulary, may be found in the techniques of structured analysis and/or "controlled English."

### Research Questions

The following questions were directed at accomplishing the objective of the research:

1. Does the application of state-of-the-art structured systems analysis techniques, developed in support of computer software requirements determination, improve the level of mutual understanding (both within and among the allied nations) of international logistics communications?

2. Does the application of "controlled English," as a vocabulary control mechanism, improve the level of mutual understanding of international logistics communications?

### Assumptions

In the development of this thesis the following assumptions were made:

1. International logistics support will continue for the foreseeable future to be an important portion of the overall U.S. DoD logistics support mission.

2. The English language, in some form, will continue to be the basis for international logistics communication.

3. Interchangeability of technical data and technology transfer will continue to increase in importance in international logistics. .

4. International co-production agreements and Cooperative Supply Support Logistics Agreements will continue their increase and their resultant increasing requirement for standardized data.

5. The current trend to automate business/logistics communications and decisions will continue, again increasing the need for standardization to allow for automation of these processes.

## CHAPTER II

### LITERATURE REVIEW AND PERSONAL INTERVIEWS

In the available literature, there is both a scarcity and an abundance of resources. As in any effort that is attempting to establish a new principle or basis for further effort, there is practically no material directly related to the objective of establishing the foundation for an international logistics language. Contrariwise, there is an abundance of information indirectly related to the objective and expanding on the related areas of:

1. general communications concepts and problems,
2. structured systems analysis techniques, and
3. controlled English.

Topics will be treated in the above order.

Communication and communication problems have become an increasingly studied subject in both the business and military fields during the past several years. It is well understood that "Communication is the binding agent of all social systems and subsystems [41:3]." Unfortunately "Communication failures are perhaps more frequent than communication successes in the lives of all of us [41:3]."

Difficulties in communication, regarding the meaning of words and terms, is well documented in such studies as Osgood, Suci, and Tannenbaum's The Meaning of Meaning (28) that discusses the development of distinctions among the various attempts to define "meaning."

Noting the confusion among lexical, semantical, and psychological definitions (28:3-30), the work proposes a new quantitative measurement of meaning, called semantic differentiation, and establishes a scale to actually measure levels of understanding. Of importance, is the appearance of the term "referent meaning," which establishes that the understanding of a term, in its context and referent surroundings is the preferable goal or measurement index to establish that "meaning" is mutually attained between the message sender and the message receiver/interpreter (28:321).

As Bernice Fitz-Gibbons has stated:

Psychologists have discovered that we think with words. We don't have thoughts and then seek for words to express them. We have to have the words first. Then we can think the thoughts [16:19].

And of words, there is no shortage in English, as there are over 450,000 words in a single dictionary and more could have been included (39:5a). The ever changing context of English language technological terms continues to bring in new words and terms e.g., television, etc.



It is, in fact, precisely in this wealth of words and their use, whether in international business communications, military oriented documents, or requirements determination for software systems, that contemporary studies identify the problem.

In international business communications an American Management Association study (15) noted many misinterpretations and communication failures caused by differentiation of background and perception of the "referent meaning." John W. Enell, AMA Vice President for Research (15:5) noted in the study:

Man has broken the sound barrier and has crossed many hurdles, but he has not yet learned to overcome the greatest barrier of all--his limited ability to exchange ideas with his fellow men. He tends to be short sighted, resistant to unfamiliar concepts, skeptical and on occasion irritable. These reactions are intensified by distances, language and cultural differences, economic variables and many other factors.

The study concluded, from its survey of 143 executives in fifty-five companies, that communication continued to be a major problem in international business.

A similar observation is made by Haney regarding the difference between progress in the technological aspects of communication vs. improvement in the communication of meaning.

Quantity, speed and coverage, however, are not the only requirements of communication. It is also imperative that we communicate clearly and precisely. But progress toward greater understandibility has come much more slowly than the technological improvements [18:5].

The problem of adequate and nonambiguous communication of technical and scientific data, with a proposed solution, is discussed at length by Dr. Russell L. Ackoff in Designing a National Scientific and Technological Communication System (1). The effort, sponsored by the National Science Foundation, contains among its concluding recommendations that an international, common language be developed. Dr. Ackoff cautions that without such an international communication medium there could not be an effective international technological communication network (1:101).

In documents oriented to military ends, there are also continuing problems. A thesis by Berry and Petersen, dealing with the international logistics agreement to sell RF-4 aircraft to the Federal Republic of Germany, noted confusion over the Memorandum of Understanding wording on contract types:

. . . the agreement used incongruous, non quantitative parameters, such as 'best effort by . . .,' 'competitive,' 'support as far as possible,' 'preferably,' and 'willingness,' in establishing the policies [2:35-36].

The incident of the RF-4 is not isolated, however, and similar terms and misunderstandings can be found in more recent documents, such as the Memorandum of Understanding on the F-16 (36).

Problems are not isolated to the international environment. The U.S. Army, for example, is experiencing

difficulties in producing adequate manuals (i.e. understandable directions). Their studies (42:6) have identified the narrative English text as the main problem and they (42:9) have concluded that "literary writing is not capable of describing a technical object." To date, they have not developed a solution. They are using "cut and try methods," to develop readable technical manuals. These methods require elaborate readability controls, involving numerical criteria for word and sentence lengths. Still, they have not been able to produce predictable results (42:9). This is similar in approach and results to the Air Force "Fog Analysis."

Frank J. Wojcicki, C.P.L., Supervisor of Technical Logistics Data Quality Assurance at Headquarters USAF, (42:15) notes that what is needed is ". . . a recognized defined basic word dictionary and a formalized rigorous industrial engineering method approach to task definition and performance."

He further states (42:9) "to change the reader to fit the technical manual is a monumental problem. Therefore the technical manual must be changed to conform to the reader's capability."

Attempts to simplify and standardize the military vocabulary, whether for specific technical applications or for general logistics applications are part of the ongoing effort to improve communications. Perhaps the

principle work in the standardization of overall logistics terminology is that done by Frederick Gluck (Col. USAF, Ret.), whose Compendium of Authenticated Logistics Terms and Definitions gathers together over eight thousand terms and three thousand abbreviations that the DoD uses in logistics (17). This is a long way, though, from the goal of an eight hundred word model, to be used in procedurally structured sentences, with graphics assistance, called for in the prior cited work on Army publications (42:13).

Nowhere, perhaps, is the exploration of this communications problem area more evident than in the discipline of software research and development. For years both business and military have been experiencing both cost overruns and outright failure in the development of software systems (35:1). The use of ambiguous language, the inability to communicate, and basic misunderstandings of words and terms are seen as the principal causes of the difficulties (35:1,5,8; 13:10; 27:10,11; 40:26-34).

Stephens and Tripp (34:101), writing on means of expressing requirements state:

Words, graphics and mathematics are widely recognized as the basic elements of communication. Words alone offer a poor choice for portraying the structure of relationships present in client needs and wants.

Victor Weinberg (40:48) states, "As the logical rules increase in complexity, English narrative description becomes less acceptable as a specification tool."

And Tom DeMarco (13:11) agrees on the problem, and states:

- . . . factors contributing to the communication problems of analysis are:
  1. the natural difficulty of describing procedure
  2. the inappropriateness of our method (narrative text)
  3. the lack of a common language . . .

In response to these difficulties, the software industry developed a technology that has come to be known as Structured Analysis and Systems Design. The evolution of this development is described in detail in the works of E. Yourdon and L. Constantine (43:3-15), Victor Weinberg (40:10-34), Tom DeMarco (13:3-35), and Kenneth T. Orr (27:1-35).

Central to the solutions developed was an increasing awareness of the importance of defining process inputs and outputs (27:13-22) and the combination of graphics, definitions, and use of defined terms, in what is called a "structured narrative," all three of which are essential if full understanding of a document is to be an attainable goal (13:31,32).

An expanded examination and explanation of the tools and principles of Structured Analysis is found in Appendix A.

In brief, structured analysis requires that:

1. Principal processes and information flows be graphically shown in what is called a "data flow diagram."

2. Actions are shown in a hierarchic (or "top-down") fashion beginning with the general and proceeding to the specific.

3. The most specific action shown is then described using only 1) a controlled, modified form of English known as structured English, 2) decision tables, or 3) decision trees.

4. All terms be rigidly defined, in a specific manner that eliminates ambiguity and redundancy (13:30ff, 129-147, 169-226; 27:107ff; 40:150-167).

The goal is to produce a document that is, according to DeMarco (13:32), "graphic, partitioned, rigorous, maintainable, interactive, logical, precise, concise, and readable." Users of the structured techniques have been unanimous in their support of its claimed benefits both in the United States, as in Boeing Company's use of structured technique to develop its Systematic Activity Modeling Method (SAMM) (34), or overseas, as in the case of A/S Kongsberg Vapenfabrikk A.A., of Norway (29:90), where the company stated: "There are many cases where specification omissions or ambiguities, which would have given rise to costly reprogramming after installation, have been caught early."



It is in the area of definition of terms and use of structured English that the theories and applications of structured analysis can be seen to overlap and blend with both contemporary psycholinguistics and the development of what is coming to be called "controlled English."

In structured analysis, according to DeMarco (13:84), "another problem, though, is that unstructured English or any other natural language, is simply not a good mechanism for expressing complex logical thought."

In response, the software industry, in structured analysis, developed structured English, using only the three grammatical constructs of Boolean Algebra: sequence, decision and repetition (13:184).

In a very real sense, this parallels contemporary emphasis in psycholinguistics, and the philosophy of language, on the critical relation of structure and meaning (31:99). First, there is the recognition that every sentence has two structures, "one in virtue of which it qualifies as a sentence, the other in virtue of which it has meaning[31:100]."

Next, it is an accepted aim to improve and systematize structure, to make it more apparent, to aid understanding and the accurate transmittal of meaning (31:106-114).

This is precisely what structured English does. In the emphasis on definitions, noted above, one can find

in the structured analysis approach a definite subscription to the linguistic/philosophical tenets of Wittgenstein: "If there did not exist an agreement in what we call 'red,' etc. etc., language would stop [38:xxxiii]."

Simultaneously, with these developments in software technology and linguistics, the commercial equipment world, as typified by Caterpillar Tractor Company, was experiencing similar problems. Their problems centered on transmitting technical instructions and information in the service and maintenance area to international customers and subsidiaries.

In response, Caterpillar Tractor Company (23:38) developed Caterpillar English as "a basic language that enables a company to produce just one English version of much of its documentation." Composed of 784 key, defined words, plus technical terms and illustrations, researchers discovered they could express all their maintenance and service information with this vocabulary alone, as long as it was used in a carefully controlled range of simple grammatical structures (23:38).

Benefits experienced by Caterpillar included not only improved understanding but also reduced language training costs. In thirty to sixty hours, Caterpillar (23:39) stated they could train "operators who previously knew no English to recognize the meaning of documents written this way."



The effort at Caterpillar was so successful that "Caterpillar English" is now commercially marketed as ILSAM (International Language for Service and Maintenance) and, in a slightly different form, as Basic 800 (23:38). Research is being continued in this area by the Communications Studies Unit of the University of Wales Institute of Science and Technology.

A similar effort, which evolved from the Caterpillar endeavor, was that made by the National Cash Register Corporation (NCR) in the development of NCR Fundamental English. NCR "had reached the point that you had to be a technical expert to read our documentation and if you were, you didn't need the document (4)." The principal problems were:

1. multiple names for the same thing,
2. jargon that was understood only by the initiated few,
3. coined words that were given vague and inexact meanings,
4. normal English words given different, technical meanings,
5. use of nouns as verbs, and
6. use of American idioms not understood outside the U.S. (25:1).

NCR also prepared a dictionary, unique both in that the definitions themselves are written in controlled

English, and in that the dictionary is tailored to their specific business efforts. The actual vocabulary was reduced to 1350 words (plus technical terms). NCR has prepared their new technical manuals using this vocabulary. The results in the field have been highly satisfactory (4).

## CHAPTER III

### RESEARCH DESIGN

#### Introduction

The purpose of this chapter is to set forward the design used to answer the research questions stated in Chapter I, and thus satisfy the basic research objective of the study. This chapter will specifically describe the control and analytical methods used to identify and explore variances in understanding among different renditions of basic Foreign Military Sales documents. Following this introduction, the chapter will define and describe the universe and population under study; the sample and its relation to the population; the experiment/data collection instrument; the variables being analyzed and their corresponding measurement methods; control of bias and related invalidating elements; data collection; the statistical techniques employed in the analysis; and, finally, the assumptions and limitations in the research design.

#### Description of the Universe

The applicable universe for this study is the body of personnel directly related to the U.S. Government, DoD Foreign Military Sales (FMS) program, and those who

use FMS documents in the performance of assigned jobs, either as direct instructional aids or as reference material. The universe includes both U.S. and allied, military, and civilian personnel who perform these tasks.

#### Description of the Population

The population investigated in this study consisted of allied officers assigned to Wright-Patterson AFB as Liason Officers to the Air Force Logistics Command, allied and U.S. officers and civilians enrolled in the Logistics or International Logistics curriculum at the Air Force Institute of Technology (AFIT), students at the Defense Institute of Security Assistance Management (DISAM), and Spanish Air Force personnel assigned to Project Peace Sigma at Sacramento ALC, McClellan AFB. This target population is both a convenience and a judgemental sample. It represented diversity of parent language, varying degrees of comprehension of the English language, varying degrees of logistics expertise, and varying levels of command/management authority in the FMS program.

#### The Sample

The sample drawn from the population consisted of twenty Allied Officers from the sources listed above and a random sample of twenty U.S. military officers and

civilian personnel enrolled in graduate logistics management programs at AFIT for a total of forty tested participants. Countries participating numbered fourteen and are listed in Table 2.

TABLE 2  
COUNTRIES REPRESENTED IN THESIS TESTING

---

---

Australia
Bahrain
Canada
Egypt
Indonesia
Japan
Jordan
Korea
Norway
Pakistan
Spain
Taiwan
Turkey
United States

---

The test sample represented fourteen countries (including the United States) and presented a truly cross-representative sampling of the characteristic logistics knowledge. (Specific demographic data is presented in Chapter IV.)

#### Data Collection Instrument

The data required for this investigation was generated by means of an experiment. The choice of an experiment is due to the basic advantages and power of such a method in determining relationships, particularly

casual, between variables (14:302). The following subparagraphs deal, in turn, with the description of the procedure used, variable definitions, and the reliability and validity of the test instrument and collection technique.

#### Description of the Procedure

First, a representative selection of FMS documents was made. This selection was made with the assistance of DISAM and AFIT staff personnel to assure that documents selected were representative of various levels of difficulty of FMS documentation and were considered "good" documents. Documents identified were the proposed Foreign Military Sales (FMS) Customer Guide (Nov 1979 Draft); the proposed revision of Procedure for Reporting Discrepancies Against FMS Shipments (Oct 1978 Draft); AFM 67-1, Air Force Supply Procedures; and a Maintenance Technical Order for the F-5 aircraft. Documents are contained in Appendix C.

Second, with the assistance and advice of these same staff personnel, a specific section, paragraph, direction or information entry was selected as representative of the document contents.

Third, in addition to the narrative version, three new versions of these sample documents were prepared, one in structured analysis technique, one in controlled

English and one using both controlled English and the structured analysis technique. (Reference pages 9 and 10 for a short definition of the two techniques and Appendices A and B for a fuller treatment.) (Versions are contained in Appendix C, following their respective, original version.)

The structured version was prepared in accordance with the guidance of Tom DeMarco's work (13). The controlled English texts were developed using the vocabulary and guidelines of the Caterpillar Company (5, 8). All test documents were prepared using the same typewriter and format to prevent any confounding effect from this source.

To assure that documents were prepared accurately, and that the techniques were not misrepresented, the controlled English version was reviewed by the Service Training Division of Caterpillar Tractor Company and the structured version by the Yourdon Company.

Neither had major suggestions for improvement. Indeed, the Training Materials Editor for Caterpillar Tractor Co. stated "the controlled English version was very good" and he wished others could do as well (20).

Fourth, a criterion test was developed, consisting of ten multiple choice questions for each sample document, seeking specific information about that document. The purpose of the test was to determine if basic under-

standing of each document was achieved. (Test questions are contained in Appendix D.)

Each complete test consisted of:

1. Introductory questions to obtain demographic information.
2. One of the above identified documents in its original narrative form.
3. One of the documents in "structured analysis" version.
4. One of the documents in "controlled English" version.
5. One of the documents in a version using both structured analysis and controlled English techniques.

No test contained more than one version of the same document nor more than one example of each version. Table 3 illustrates the sixteen possible combinations of the test documents that yielded four complete test versions.

6. Criterion test (ten multiple choice questions) for each document.
7. Following the multiple choice portion, the test contained ranking questions that requested that each subject rate the author's competence as a writer and then rate each author's knowledge of the subject matter on nine point scales.



TABLE 3  
TEST VERSION  
Random Treatment Allocation to Tests to Allow Two-Factor  
ANOVA

Document (Factor B)	Version (Factor A)			
	Narrative	Controlled English	Structured	Structured/ Controlled
FMS Customer Guide	a	b	d	c
SAAC Discrepancy Procedures	b	a	c	d
AFM 67-1, RIW Procedure	c	d	b	a
F-5 T.O.	d	c	a	b

Where: a = Version and document in test series I.  
b = Version and document in test series II.  
c = Version and document in test series III.  
d = Version and document in test series IV.

8. After all documents had been read and the test completed, subjects were requested to indicate their preference for the four different types of documentation presented, i.e. to rank them from most liked to least liked.

Fifth, sample population personnel were contacted and briefed on the purpose and nature of the experiment. This briefing included essential guidance on how to read structured and controlled English documents. Briefing

contents were identical for all personnel. The initial briefing was attended by the thesis advisor to assure that the briefing was purely factual and informational in nature and would not tend to bias results.

Sixth, document versions were randomly assigned to sample personnel only assuring an equal number of tests for each test series.

Seventh, personnel were provided the test and answer sheets and the test administered under controlled, timed, monitored conditions. The time required for each subject to read each document was recorded in minutes.

The criterion for the measurement of the effectiveness of the various versions consists of the four measures of:

1. Results of the multiple choice test on comprehension.
2. The time measurements.
3. The judgment of the author's competence as a writer.
4. The judgment of the author's knowledge of the subject matter.

The criterion for measuring the acceptability/desirability of the various versions consists of the final ranking of the documents at the end of the test.

### Variable Definitions

There are two dependent variables. The first, related to the objective multiple choice portion of the test, the timing, and the judgments on the author's competence and knowledge, is understandability/degree of understanding, measured/shown by the test. The second is related to the preference question at the end of the test where the participants ranked each of the documents as to acceptability.

The independent variables for the first portion of the test are 1) documentation version and 2) document identity/subject matter. The independent variable for the ranking and preference portions is the subjective rating of the subject.

### Validity and Reliability

The following steps have been taken to enhance the validity and reliability of the experiment:

1. The original narrative version is in the test as a control treatment since the general effect of the new treatment is unknown (26:673) and to assure that the tests were truly comparative (26:105).

2. To protect against bias, the assignment of treatments to experimental units was made in a random fashion determined by their uncontrolled pattern of entry to the test room.

3. A complete multi-factor study was chosen to gain knowledge of interactions, strengthen validity and permit valid inferences about the primary factors over a wider possible range (26:551-552).

4. Equal sample sizes were selected for each of the factors to maximize the precision of comparison for each pairwise comparison (26:492).

5. All documents used were selected in coordination with, and reviewed by, AFIT faculty and DISAM personnel, to eliminate or reduce personal bias and to assure context validity of the test material (14:120).

6. The use of a statistically large sample ( $>30$ ) allows, not only the testing of the normalization of response error factors but a consistency of results test to allow determination of reliability (14:123). Additionally, the administration of four separate tests to the sample forty people yields a duplication of ten for each test. With ten questions for each of the four documents and four versions this will yield a total of forty responses per version and per document and ten overall scores per individual test response cell. In testing normality of residual error distribution, normality can be assumed. This is because factor level sample sizes can be combined for all treatments. The  $\epsilon_{ij}$  (residuals) for all treatments can be combined into one, larger group and treated as a sample size of forty (26:506).

7. Test data, in addition to being randomized, were blocked, to match equal numbers of personnel with English as their native language and allied personnel with a native language other than English (twenty each) with each experimental treatment applied randomly, to eliminate unwanted sources of variability and assure inferential validity (26:722-725; 3:102-106,208).

8. Emphasis was placed on the experimental design so that unequivocal answers, with minimal impact of experimental error could be obtained. This will significantly decrease the difficulty in analysis and make many conclusions evident from simple data inspection (3:7).

#### Data Analysis

This section provides details of the basic approach to the analysis of data generated by the experiment design which was just described. The experiment produced several distinct data groupings for analysis. The first of these was the results of the multiple choice testing. These data were in a form allowing application of two way, multi-factor, analysis of variance techniques. The choice of this specific analysis technique was due to: 1) the well documented acceptance of the block design, multi-factor ANOVA in statistical studies of this type (12:153; 26:551-552; 3:208-241) and 2) the robustness of the model (26:501). This latter point assures that,

even though steps were taken to assure compliance with the model assumptions of normality, independence and equal variance of the error terms (through use of a large sample with addable error terms and independent test by random assignment), the analysis would still be valid if these steps had not been taken or were not done as correctly as possible. This is due to the fact that:

- 1) for the model, lack of normality is not an important matter and the point estimates of factor level means and contrasts are unbiased whether or not the populations are normal (26:513) and 2) if error variances are unequal the test for equality of means is only slightly affected if all factor level sample sizes are equal (26:514) as is being done in this case.

The second group of data, responses to the judgment questions, on the author's competence and judgment, will be analyzed by simple analysis of variance. Next, the timing data, analyzed by simple analysis of variance, will be used to further analyze the results of the above two types of data and the following preference data. Finally, responses to the preference question will be analyzed using Kendall's coefficient of concordance. The two-way ANOVA and the Kendall's coefficient techniques are treated, in turn, below.

## Two Way Analysis of Variance

Answers to test questions will be arranged in a complete multifactor two way analysis of variance table with multi-cell entries representing the scores of each test participant for each type and version of document. The model used for this analysis is a mixed effect model with equal sample sizes  $n$  for each treatment, and is formulated (26:618):

$$Y_{ijk} = \mu_{..} + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \epsilon_{ijk}$$

where

$\mu_{..}$  is a constant

$\alpha_i$  are constants subject to  $\sum \alpha_i = 0$  and are the main effects for factor A at the  $i$ 'th level

$\beta_j$  are constants subject to  $\sum \beta_j = 0$ , are the main effects for factor B at the  $j$ 'th level and are independent  $N(0, \sigma^2)$

$(\alpha\beta)_{ij}$  are constants subject to  $\sum (\alpha\beta)_{ij} = 0$ , and are  $N(0, \frac{a-1}{a} \sigma_{\alpha\beta}^2)$ , represents the interaction between A and B at the  $i$ 'th and  $j$ 'th levels respectively.

$\epsilon_{ijk}$  are independent  $N(0, \sigma^2)$  and independent of

$\beta_j$  and  $(\alpha\beta)_{ij}$

$\beta_j$  and  $(\alpha\beta)_{ij}$  are independent.



for

$$i = 1, 2, \dots, a_j$$

$$j = 1, 2, \dots, b_j$$

$$k = 1, 2, \dots, n$$

The mixed model was selected as the experiment involves one factor (the four versions) with fixed effects, as interest centers on the versions and it is about the versions that inferences will be made. This is contrasted with the other factor (the documents) the levels for which may be viewed as random since any inferences here will be made about the population of documents of which the four used in this study are a sample.

With this model, with the versions (Factor A) with fixed effects and the documents (Factor B) with random effects, the  $\alpha_i$  effects will be constants and the  $\beta_j$  effects and the interaction effects  $(\alpha\beta)_{ij}$  are random variables. This model will allow the following testing to take place (all  $\alpha$  levels will be set at  $1 - \alpha = .90$ ):

1. Test for interactions. To determine if there is an interaction between the two factors being studied the following (26:624) will be tested:

$$C_1: \sigma_{\alpha\beta}^2 = 0$$

$$C_2: \sigma_{\alpha\beta}^2 \neq 0$$



The  $F^*$  statistic, where  $F^* = \frac{MSAB}{MSE}$  will be used for this test. The test is:

If  $F^* \leq F(1 - \alpha; (a - 1) (b - 1), (n - 1) ab)$ , conclude  $C_1$

If  $F^* > F(1 - \alpha; (a - 1) (b - 1), (n - 1) ab)$ , conclude  $C_2$

where

$C_1$  = no interaction

$C_2$  = interaction

2. Test for Factor A (version difference) effects.

To determine if there is an effect the factor level means test will be used (26:580) expressed as:

$C_1: \mu_1 = \mu_2 = \mu_3 = \mu_4$

$C_2$ : not all  $\mu$  are equal.

Again the  $F^*$  statistic will be used where

$$F^* = \frac{MSA}{MSAB}$$

where

If  $F^* \leq F(1 - \alpha; a - 1, (b - 1))$  conclude  $C_1$

If  $F^* > F(1 - \alpha; a - 1, (b - 1))$  conclude  $C_2$

3. Test for effectiveness. If  $C_2$  is concluded in the Factor A test, the difference in the mean under-

standability of the version will be determined by sequentially testing, in pairs, each of the versions by (26:626):

- a. Developing a point estimate of  $L = \mu_1 - \mu_2$  as

$$\hat{L} = \bar{Y}_{1..} - \bar{Y}_{2..}$$

- b. Estimating the variance as

$$s^2(\hat{L}) = \frac{2MSAB}{bn}$$

- c. Constructing the confidence interval as

$$\hat{L} - t(1 - \alpha/2, df) \leq \mu_1 - \mu_2 \leq \hat{L} + t(1 - \alpha/2, df)$$

4. Test for Factor B (level of documentation effects). As for Factor A, except that

$$F^* = \frac{MSB}{MSE} \text{ and the comparison statistic is } F(1 - \alpha; b - 1, (n - 1)) \text{ ab.}$$

#### Kendall's Coefficient of Concordance

To determine the actual preference of versions (N) among tested individuals (K), the measure will be based on the linear function of the average ranking of all participants. The procedure (33:229-239) is:

First: Display individual rankings, as in Table 4, a table of K x N dimension.

Second:  $R_j$ , sum of ranks for each entity, is computed.

Third: Compute the mean of  $R_j$ ; express each individual  $R_j$  as a deviation from that mean. Square the deviations and sum them to obtain the test statistic "s."

Fourth: Compute the test statistic  $W$  according to

$$W = \frac{S}{1/12 k^2 (N^3 - N) - k \sum T}$$

(for a large number of ties)

when

$$T = \frac{(t^3 - t)}{12}, \quad t = \text{number of ties.}$$

Fifth: Interpret  $W$ , as the degree of variance among participants in the ranking and obtain the ranking itself by a direct comparison of the  $R_j$ 's from Table 4. The lowest  $R_j$  sum (i.e. that closest to the number of participants,  $K$ ) is the overall preference.

#### Assumptions and Limitations

The research design necessarily includes a number of assumptions and limitations essential to the conduct of the experiment, follow-on analysis and the development of conclusions.

#### Assumptions

1. The underlying axioms and assumptions of statistical methods used are valid.
2. Use of the random sample and random assignment of test versions to the participants assures that the

TABLE 4  
RANKING OF VERSIONS

Version	1	2	3	4	Sum
Participant # 1					
2					
3					
.					
.					
.					
.					
.					
.					
.					
.					
.					
.					
.					
.					
.					
.					
Sum R <sub>j</sub> :	40				

ACTUAL INDIVIDUAL PREFERENCE/RANKS  
will be displayed in this Table.

results are representative of the population and the universe.

3. Participants are honest in their replies to both objective and subjective portions of the test.

### Limitations

1. The overall effectiveness of versions of the documents is subject to the particular technology used and cannot be extrapolated to other "structured" techniques or limited vocabulary approaches.

2. Inferences of improved understandability beyond the scope of the logistics area can be surmised but is not intended nor demonstrated.

3. Data could have been collected from Allied personnel, in country, but, due to time and monetary constraints, it was not.

## CHAPTER IV

### ANALYSIS

The following sequence of data presentation and analysis corresponds to the order of the data gathered in the experiment.

First, the demographic data on test participants will be presented and analyzed.

Second, the data on the criterion test, on the various versions, will be presented and analyzed.

Third, the data on timing and the ranking of author writing and technical competence will be presented and analyzed.

Fourth, the data on version ranking (order of preference) will be presented and analyzed.

#### Demographics

##### General

The overall test participants included twenty native English speakers and twenty speakers of other languages. Overall, test participants had five plus years of experience in logistics with five claiming one year or less experience, nine claiming two to four years, three claiming four to five years and twenty three over

five years. Logistics disciplines/fields represented, and the number of each are shown in Table 5.

TABLE 5  
LOGISTICS FIELDS--NUMBERS IN  
EACH FIELD

Field	Number with Experience*
Maintenance . . . . .	11
Transportation . . . . .	2
Storage . . . . .	4
Requirements . . . . .	9
Engineering . . . . .	3
Acquisition/Contracting . . . . .	10
Technical Documentation . . . . .	4
Automated Systems . . . . .	7
Base Level Supply . . . . .	6
None . . . . .	4

\*Numbers total over forty as some participants identified two or more fields.

#### English Speaking

Among native English speakers, the average participant had four to five years logistics experience with three claiming one year or less, five claiming two to four years, two claiming four to five years and ten claiming over five years. Logistics disciplines/fields represented, and the number of participants in each are shown in Table 6.

TABLE 6  
LOGISTICS FIELDS--NATIVE ENGLISH SPEAKING,  
NUMBERS IN EACH FIELD

Field	Number with Experience*
Maintenance . . . . .	6
Transportation . . . . .	0
Storage . . . . .	1
Requirements . . . . .	4
Engineering . . . . .	1
Acquisition/Contracting . . . . .	3
Technical Documentation . . . . .	2
Automated Systems . . . . .	1
Base Level Supply . . . . .	4
None . . . . .	3

\*Numbers total over twenty as some participants identified one or more fields.

#### Other Native Language

Among participants with other than English as a native language, the average time for length of logistics experience was over five years with two claiming one year or less experience, four claiming two to four years, one claiming four to five, and thirteen claiming over five years. Logistics disciplines/fields represented, and the number of participants in each are shown in Table 7.

As to the degree of English language proficiency among those with a native language other than English, the



TABLE 7

LOGISTICS FIELD--OTHER NATIVE LANGUAGE PARTICIPANTS  
NUMBERS IN EACH FIELD

Field	Number with Experience*
Maintenance . . . . .	5
Transportation . . . . .	2
Storage . . . . .	3
Requirements . . . . .	5
Engineering . . . . .	2
Acquisition/Contracting . . . . .	7
Technical Documentation . . . . .	2
Automated Systems . . . . .	6
Base Level Supply . . . . .	2
None . . . . .	1

\*Numbers total over twenty as some participants identified one or more fields.

average length of time that participants had known/used English was five to ten years with five to ten years also being the average time in the past that they had studied English in school. Related to their understanding of specific American idioms, as determined by their length of stay in the U.S., the average participant had been in the U.S. about two years with five having been in the U.S. for two to three years and only two having been in the U.S. over three years (total).

### Demographic Analysis

An analysis of Table 5, on the general data for all participants, indicates a predominance of experience in the Maintenance and Contract/Acquisition area. The presence of this knowledge would indicate that participants would be anticipated to have an easier time with any documents related to these areas. Specifically, this would be anticipated to influence reaction to, and understanding of, the F-5 T.O. Although, from the U.S. point of view, no documents relates specifically to U.S. acquisition/contracting, from an FMS point of view, i.e., looking at the documents from an allied officer's viewpoint, the section from the FMS customer guide must be judged as related to this area. As can be seen by comparing Tables 6 and 7, the majority of those claiming acquisition/contracting experience are allied personnel. It could also be anticipated then that this could impact scores achieved on that document, by allied officers. Lastly, Table 7 indicates that a majority of personnel claiming experience in automated systems are allied personnel. Specifically these represent the Spanish Peace Sigma personnel who have been working with structured analysis for about one year. It can be anticipated that this experience would impact their understanding and ranking of structured documentation versions.

As will be seen in the analysis of the test data below, the first of these anticipated impacts was, in fact, able to be verified to some degree. No major impact occurred, though, due to the randomization pattern of document subject and document versions. Specific impacts that did occur are discussed in the sections on the criterion test and rankings. The second anticipated impact (Spanish experience with structured analysis) occurred only in the rank preferences and not in level of understanding data reflected in the criterion test.

### Criterion Test

#### General Data

The basic data for the criterion test are displayed in Table 8. Numbers displayed at each Factor intersection are the average scores ( $\bar{X}$ ) (i.e. the specific  $\mu_{ij}$ ) for that cell. It is the  $\mu_{ij}$  for the ten individual test scores composing that cell.

From this data the specific factor effects can be obtained. These data are shown in Tables 9 and 10.

The treatment means in Table 8 indicate the level of understanding (as expressed by the criterion test score) was not the same for each document or version. This can also be seen in the row and column averages.

When the specific and main understanding effect by version was measured in Table 9 it can be seen that the

TABLE 8  
CRITERION TEST DATA  
TREATMENT MEANS

Factor B Documents	Factor A--Version				Row Average $i$
	$j = 1$ Narrative	$j = 2$ Controlled English	$j = 3$ Structured	$j = 4$ Structured Controlled	
FMS Customer Guides, $i = 1$	64( $\mu_{11}$ )	49( $\mu_{12}$ )	43( $\mu_{13}$ )	42( $\mu_{14}$ )	49.5( $\mu_{1.}$ )
SAAC Discrepancy Procedures, $i = 2$	38( $\mu_{21}$ )	55( $\mu_{22}$ )	23( $\mu_{23}$ )	20( $\mu_{24}$ )	34( $\mu_{2.}$ )
AFM 67-1, RIW Procedures, $i = 3$	57( $\mu_{31}$ )	64( $\mu_{32}$ )	24( $\mu_{33}$ )	14( $\mu_{34}$ )	39.75( $\mu_{3.}$ )
F-5 T.O., $i = 4$	63( $\mu_{41}$ ) $\mu$	64( $\mu_{42}$ )	54( $\mu_{43}$ )	75( $\mu_{44}$ )	64( $\mu_{4.}$ )
Column Average	55.5( $\mu_{.1}$ )	58( $\mu_{.2}$ )	36( $\mu_{.3}$ )	37.75( $\mu_{.4}$ )	46.8125( $\mu_{..}$ )

TABLE 9  
SPECIFIC/MAIN FACTOR EFFECT  
FACTOR A--VERSION

	j = 1	j = 2	j = 3	j = 4
8 i = 1	+14.5( $\beta_{1(1)}$ )	-0.5( $\beta_{2(1)}$ )	-6.5( $\beta_{3(1)}$ )	-7.5( $\beta_{4(1)}$ )
i = 2	+4( $\beta_{1(2)}$ )	+21( $\beta_{2(2)}$ )	-11( $\beta_{3(2)}$ )	-14( $\beta_{4(2)}$ )
i = 3	+17.25( $\beta_{1(3)}$ )	+24.25( $\beta_{2(3)}$ )	-15.75( $\beta_{3(3)}$ )	-25.75( $\beta_{4(3)}$ )
i = 4	-1( $\beta_{1(4)}$ )	0( $\beta_{2(4)}$ )	-10( $\beta_{3(4)}$ )	+11( $\beta_{4(4)}$ )
Column Average Main Effects	8.6875( $\beta_1$ )	11.1875( $\beta_2$ )	-10.8125( $\beta_3$ )	-9.0625( $\beta_4$ )

TABLE 10

SPECIFIC/MAIN FACTOR EFFECT  
FACTOR B--DOCUMENT

	j = 1	j = 2	j = 3	j = 4	Row Average/ Main Effects
i = 1	+8.5( $\alpha_{1(1)}$ )	-9( $\alpha_{1(2)}$ )	+7( $\alpha_{1(3)}$ )	+4.25( $\alpha_{1(4)}$ )	-1.5625( $\alpha_1$ )
i = 2	-17.5( $\alpha_{2(1)}$ )	-3( $\alpha_{2(2)}$ )	-13( $\alpha_{2(3)}$ )	-17.75( $\alpha_{2(4)}$ )	-12.8125( $\alpha_2$ )
i = 3	+1.5( $\alpha_{3(1)}$ )	+6( $\alpha_{3(2)}$ )	-12( $\alpha_{3(3)}$ )	-23.75( $\alpha_{3(4)}$ )	-7.0625( $\alpha_3$ )
i = 4	+7.5( $\alpha_{4(1)}$ )	+6( $\alpha_{4(2)}$ )	+18( $\alpha_{4(3)}$ )	+37.25( $\alpha_{4(4)}$ )	+17.1875( $\alpha_4$ )

effect of controlled English, overall, as expressed by  $\beta_2$  is superior to all others. This is supported by the Table 8 column average  $\mu_{.2}$ . Following controlled English in order are: the narrative English, structured/controlled and structured techniques.

The specific and main effects of the different documents, indicated by  $\alpha_{(i(j))}$  and  $\alpha_i$ , respectively, are shown in Table 10. According to the data presented, the most understandable of the documents was, by far, the T.O. This, also, is supported by the  $\mu_{4j}$  and  $\mu_4$  data in Table 8. Following the T.O., in order of understandability, were the FMS Customer Guide (significantly below the T.O.), the AFM 67-1 RIW Procedure and then the SAAC Discrepancy procedure.

### Interaction

The presence of interaction between the treatment factors is determined by examining if all  $\mu_{ij}$  can be expressed (26:561) as:

$$\mu_{ij} = \mu_{..} + \alpha_i + \beta_j$$

If not, then there is interaction. Such interaction is denoted as  $(\alpha\beta)_{ij}$  and is defined as

$$(\alpha\beta)_{ij} = \mu_{ij} - \mu_{i.} - \mu_{.j} + \mu_{..}$$



Interactions, in accordance with this definition, are shown in Table 11.

TABLE 11  
INTERACTIONS

	j = 1	j = 2	j = 3	j = 4	Raw Average
i = 1	5.8125	-11.6875	4.3125	1.5625	0
i = 2	-4.6875	9.8125	-0.1875	-4.9375	0
i = 3	8.5625	13.0625	-4.9375	-16.6875	0
i = 4	-9.6875	-11.1875	0.8125	20.0625	0
Column Average	0	0	0	0	

The interactions depicted in Table 11 may be interpreted as the difference between the specific effect of the versions (Factor A) at the i'th level, for a type of document (Factor B) at the j'th level ( $\alpha_{i(j)}$ ) and the main effect of the version at the i'th level.

The divergence of the figures from 0 in Table 11 shows that some interactions are taking place. The greater the divergency from 0, the greater the interaction. The greatest interaction, overall, takes place in the T.O. when in the structured/controlled version. In general, the interaction indicator can serve as a guideline as

to where the maximum benefit from adoption of one version vs. another may be experienced (26:551-552). As to how significant the interaction, as to its impact on the overall effect, this will be tested in the following section.

From the above data, particularly Table 8, the essential statistics for the balance of the analysis is obtained. Specifically, it may be calculated (26:619):

$$\begin{aligned} \text{MSA} &= \sigma^2 + nb \frac{\sum a_i^2}{a-1} + n\sigma_{a\beta}^2; \text{df} = a - 1 \\ \text{MSAB} &= \sigma^2 + n\sigma_{a\beta}^2; \text{df} = (a - 1)(b - 1) \\ \text{MSE} &= \sigma^2; \text{df} = (n - 1) ab \\ \text{MSB} &= \sigma^2 + na\sigma_{\beta}^2; \text{df} = (a - 1)(b - 1) \end{aligned}$$

as follows, with

$$\begin{aligned} \text{SSA} &= 2,066.688 \\ \text{SSB} &= 1598.688 \\ \text{SSAB} &= 1,502.191 \text{ and} \\ \text{SSE} &= 13,527.081 \end{aligned}$$

The ANOVA data is as in Table 12.

From Table 12 come the  $F^*$  statistics for:

1. the test to determine the significance of the interaction (the existence of some interaction has already been shown in Table 11, above),

$$F^* = \frac{\text{MSAB}}{\text{MSE}} = 0.999$$

TABLE 12  
ANOVA TABLE FOR VERSION DATA

Source of Variation	SS	df	MS	F*
Factor A (Version)	2,066.688	3	688.896	4.127
Factor B (Document)	1,598.688	3	532.896	3.191
AB interactions	1,502.191	9	166.910	0.999
Error	13,527.081	81	167.001	

with the decision rules

$$F^* \leq F(1 - \alpha; (a - 1)(b - 1), (n - 1) ab), = C_1 = 1.63 = \text{no significant interaction}$$

$$F^* > F(1 - \alpha; (a - 1)(b - 1), (n - 1) ab), = C_2 = 1.63 = \text{significant interaction}$$

As  $F^* \leq F, C_1$  is concluded, interaction is not a significant factor, even though it is occurring. This can also be seen from the presence in Table 10 of both positive and negative interaction figures that, by and large, tend to cancel each other. (This allows the possibility that the improved understanding, seen in Tables 8 and 9 data, was due to interaction vs the action of one of the factors, to be dropped from consideration.)

2. The test to determine if Factor A, the versions, did have a significant effect on understanding.

$$F^* = \frac{MSA}{MSAB} = 4.127$$

and the Decision Rules for Factor A (Versions) having an effect

$$F^* \leq F(1 - \alpha; a - 1, (a - 1)(b - 1)) = F(.95; 3, 9) = 2.81, \text{ conclude } C_1 = \text{effect}$$

$$F^* > F(1 - \alpha; a - 1, (a - 1)(b - 1)) = F(.95; 3, 9) = 2.81, \text{ conclude } C_2 = \text{no effect}$$

As  $F^* > F$ ,  $C_2$  is concluded, the versions did have a significant effect on the understandability of the documents. This, of course, was also obvious from inspection of the data in Tables 8, 9 and 10 i.e. there is a definite impact of the various versions on understandability, with controlled English having the greatest positive impact as seen in Tables 8 and 9.

To validate that, in fact, Tables 8 and 9 do show controlled English has a significantly greater impact (visually confirmed by the higher  $\mu_{.2}$  in Table 8 and  $\beta_2$  in Table 9). The confidence interval can be constructed thus:

$$\hat{L} - t(1 - \alpha/2; df)(sL) \leq \mu_{.2} - \mu_{.1} \leq \hat{L} + t(1 - \alpha/2; df)(sL)$$

which computes to

$$\begin{aligned} 2.5 - (1.263)(.914) &\leq \mu_{.2} - \mu_{.1} \leq 2.5 + (1.263)(.914) \\ 1.337 &\leq \mu_{.2} - \mu_{.1} \leq 3.763 \end{aligned}$$

As the confidence interval does not include  $\emptyset$  and  $\mu_{.2} - \mu_{.1} = 2.5$  it can be concluded that controlled English is more effective than narrative English.

### Structured Technique Results

One of the results that might have been anticipated, as noted above, was that the Spanish personnel, who had worked with the structured materials for over a year, would have scored higher in that area. Such was not the case. Once again the ranking was controlled English first, narrative second and the structured techniques a distance third and fourth.

An analysis was made to determine why the structured techniques scored significantly lower than the other versions. Surprisingly, seventeen of the forty participants had higher scores in the structured versions than in the other versions. This would seem to argue that the structured version should have scored higher than the others. That they did not was traced to the fact that the other twenty-three participants who had higher scores in the narrative and controlled English versions had exceptionally low scores in the structured techniques, while those who scored higher in the structured techniques scored moderately well in the other versions. Of those who did score well on the structured documents, only two (11.8%) had maintenance backgrounds. Compared to the relatively high percentage of test participants with a background in maintenance (28%--the highest percentage of all the logistics fields represented) this is somewhat surprising as the second highest group (acquisition/

contracting) with 25% of participants claiming experience in that area, representing 47% (eight of seventeen) of those who did well on the structured techniques. Of the Spanish Air Force participants, from the Peace Sigma project, 50% (five of ten) scored higher on the structured techniques.

All test participants were observed during the test. It was noted that approximately 50% (twenty-one) did not follow the recommended procedures for reading structured documents (reference instructions on front of test in Appendix 'D, instruction #3). This was in spite of the earlier briefing on the proper technique and the instruction itself. Those who did not follow the instructions were observed to exhibit signs of agitation and frustration during this portion of the test and were apparently "lost" in the document, flipping pages back and forth (a definite indication that instructions are not being followed) and frequently looking back at the document text while answering the questions. Eight of these documents were able to be identified after the testing to the test participant (by information volunteered by the participant) and they were among the lowest scoring in the structured techniques. It might be assumed that the other low scores belonged to the other participants who exhibited like behavior. The longest

time in reading the documents, shown in the next section, was also exhibited by this group.

### Time Factor

Basic data for time analysis is shown in Table 13.

TABLE 13  
READING TIME DATA

Statistics	Versions			
	Narrative	Controlled English	Structured	Controlled Structured
$\bar{X}$	7.27	7.26	8.92	9.34
$\sigma$	3.421	4.54	4.0781	4.78
$\sigma^2$	11.703	20.62	16.63	22.88

As can be seen, there is no significant difference between narrative and controlled English. There is a significant increase, however, between these two versions and the structured version. Among those who scored higher in the structured than in the narrative, the figures are quite different, with all figures falling between 8.1 and 8.8 minutes. This group took less time than the overall average on the structured documents and more on the narrative and controlled English versions. This first (taking less time) is judged as being due to their following the prescribed procedures. The latter (increase in time on



narrative and controlled English) is reflected in their scores. As stated above, though their scores on structured documents were better than the other two versions, their overall average, even in the narrative and controlled versions is higher than the general average.

#### Rating of Authors

Rating of the authors as to competence and knowledge, when all participants were included, showed that narrative English was assigned the highest overall ratings, averaging 6.52 and 7.53 respectively. Total ratings are in Table 14.

TABLE 14  
AUTHOR RATINGS

Version	Rating	
	Competence	Knowledge
Narrative	6.20	7.59
Controlled English	5.6	7.29
Structured	4.97	7.13
Controlled/ Structured	5.59	7.13

The situation changes radically, however, when one looks at the ratings assigned by the allied officers. These data are shown in Table 15.

TABLE 15  
ALLIED RATINGS OF AUTHORS

Version	Rating	
	Competence	Knowledge
Narrative	6.52	7.53
Controlled English	7.00	8.00
Structured	6.06	7.62
Controlled/ Structured	6.29	7.54

Among the group noted earlier, that scored high with the structured documents, they assigned the highest ratings to the structured/controlled version with ratings of 7.25 and 7.92 for competence and knowledge, respectively.

#### Preference Ranking for Versions

The basic ranking data is displayed in Table 16. From this table it can be seen that the overall choice is controlled English, with the lowest  $R_j$  sum. The degree of agreement is determined by the statistic  $W$ , with 1 being perfect agreement and 0 being no agreement. As there are only two participants with ties (#4 and #8), the impact is negligible and may be dropped from the equation.

TABLE 16  
RANKING OF VERSIONS

Version	Narrative	Controlled English	Structured	Structured/ Controlled
Participant				
#1	2	1	3	4
2	1	2	3	4
3	2	4	3	1
4*	2	2	1	3
5	2	1	3	4
6*	1	2	3	4
7*	2	1	4	3
8*	2	1	2	2
9*	2	3	1	4
10	4	2	3	1
11*	4	3	2	1
12*	2	1	4	3
13*	2	3	4	1
14*	2	3	4	1
15*	3	4	1	2
16*	4	1	3	2
17*	4	1	2	3
18*	4	3	2	1
19*	4	1	3	2
20*	1	2	4	3
21*	1	3	2	4
22*	3	2	4	1
23*	4	2	3	1
24*	3	4	1	2
25	2	1	4	3

\* Allied Officers

TABLE 16--Continued

Version	Narrative	Controlled	Structured	Structured/ Controlled
	English	English	English	English
Participant				
#26	1	2	3	4
27	3	4	2	1
28	4	3	1	2
29*	2	3	1	4
30	3	2	1	4
31	2	1	4	3
32	1	2	3	4
33	1	2	4	3
34	1	2	4	3
35	2	4	3	1
36	2	3	4	1
37	4	3	1	2
38	2	1	4	3
39	1	2	4	3
40	1	2	3	4
$\Sigma R_j$	93	89	111	102
*Allied Officer			Sum 395	
$\bar{R}_j$	2.325	2.225	2.775	2.550

So, one is left with

$$W = \frac{12S}{k^2(N^3 - N)} = .5439$$

From this it can be seen that a majority of the raters agree with that ranking. The significance of that

agreement can be determined from the Friedman test for ranked data or the "Q" test of Neter and Wasserman (26:747-749). For the "Q" test, the test statistic Q is

$$Q = K(n - 1)W \quad (\text{This is equal to the } X_r^2 \text{ of the Friedman test.})$$

Here  $Q = 65.268$

The distribution of Q is approximated by Chi square with  $n - 1$  degrees of freedom. This yields an asymptotic approximation of the P-Value. As this is less than .001 ( $1 - \alpha > .999$ ) it can be concluded that the ranking relation is statistically significant.

For the Friedman test, at 90 percent confidence,

$$\chi^2(.90; 3) = 6.25$$

as  $65.268 > 6.25$  it can likewise be concluded that there are significant differences in the ranking expressed between the versions.

This is in accordance with the accepted fact that as the S and W statistics become large, there is increasing agreement on the ranking (26:747). As S in the above formula for W is equal to 4351.2, it can be concluded that there is a good degree of agreement, i.e. it is statistically significant.

As to the number and source of the various rankings the following data is offered. Only ten participants

ranked narrative English as their first preference and of these only three were allied officers, the target population for FMS documents. Over half of all participants (twenty-four) ranked controlled English as their first or second choice. The Spanish officers split 50/50 between preferring structured or controlled English documents for their first choice. Of the two structured styles, the controlled English/structured version is generally preferred by all participants over the uncontrolled versions. The Spanish officers preferred the controlled English version four to one over the regular structured version.

Of special interest, however, is the ranking assigned by the target population for FMS documents, the allies. Their preference is different than the overall ranking. It is: first, controlled English; second, controlled/structured; third, structured; and fourth, and last, narrative English. Thus, although there is some disagreement on how far down narrative English ranks, between the total participants and just the allies, there is agreement on the first preference, controlled English.

It should be noted that even though the allied officers ranked the controlled/structured version as number two, their objective scores on the criterion test did not show this version as their second highest score.

It is believed that the time factor had an influence here. Specifically, all documents were restricted to a total of twenty-five minutes for reading and answering the questions; it took longer to read the structured versions (reference Table 13 for overall data, allied average times were longer for all versions), thus leaving less time to read and answer the questions. This is born out in examining the answers given, as the allied officers completed fewer questions for the structured documents than for the narrative and controlled English versions. Removal of the time restraint might have changed criterion scores to correspond to the preference ranking.

#### Other Data

Some comments and remarks made by participants may have relevance. Specifically fourteen participants (allied and U.S.) commented on the benefits and desirability of the dictionary used in structured documents i.e. they saw a distinct benefit in defining technical terms in that manner vs. a "normal" definition. Four of the U.S. participants noted that although reading the structured documents was "hard work," they had greater certitude that their answers were right. They attributed this, in large part, to the definition technique of the dictionary.

Lastly, an analysis of language groups represented by participants, especially the allies, shows that most major language groupings, except for Russian, the dialects of Black Africa, India and the area that was called Indochina (Burma, Malaysia, Vietnam, etc.), for every populated continent, are represented in the test sample. Table 17 shows this data.

TABLE 17  
LANGUAGE REPRESENTATION

Native Languages of Test Population	
	Arabic
	Chinese
	English
	Indonesian
	Japanese
	Korean
	Norwegian
	Spanish
	Urdu



## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

From the above analysis, the following conclusions can be drawn, and answers given to the initial research questions.

Question 1 asked if the application of structured analysis techniques would improve FMS documents.

The answer must be: No. Data does not support such a change. Such techniques are apparently better left to the analysts, as the data and analysis do not support improved understanding in these methods. As stated in the analysis section, this may, in part, have been due to the time restraint. One side benefit to this general technique, however, can be noted. In the development of the alternate versions of all the documents, the requirement to place them into the structured format did force several changes in the choice of documents to be used. This is precisely because of the method's strength as an analysis tool, i.e. initial structured versions frequently identified major errors and shortcomings in the original narrative document being converted to structured format. Development of the data flow diagrams revealed

missing information, information not being provided when required, redundancy/duplication of effort, non-use of some information required by another section of the document, incomplete specification of required actions, etc. Knowledge/use of this technique to analyze a proposed document to be produced in any format or version would lead to clearer, more complete and logical documents.

It can also be concluded from the comments of participants, that the structured definition technique of defining terms by their component elements is a beneficial element of structured analysis, with benefits that seem transferable to other than structured documents. This will be further discussed below, under recommendations.

Question 2 asked if the application of controlled English would improve FMS documents.

The answer is a definite yes. All data and analysis supported the conclusions that:

1. Documents are significantly more understandable when written in controlled English as opposed to either conventional narrative English or the structured techniques, and

2. Documents in controlled English would be preferred to documents in narrative English.

Both conclusions are further strengthened when one isolates the responses of the allied participants.

Then it can be concluded that:

1. Regardless of language group, a change to controlled English will result in more understandable documentation for our allies.

2. Such a change (based on the preference rankings) would be welcomed by our allies.

Additionally, the analysis indicates that such a conversion would be beneficial to the reader, regardless of logistics background, i.e. beneficial to those with maintenance backgrounds as well as acquisition, etc., thus demonstrating applicability to all FMS documentation: policy, procedures and instructions, all of which were represented in the sample documents.

### Recommendations

In so far as the FMS program is itself a tool for the furtherance of U.S. foreign policy, then any action that would make the FMS program more acceptable to the allies, and make the program more efficient, must be seen, in turn, as contributing to the furtherance of U.S. foreign policy.

Test data, data analysis and conclusions of this paper do, in fact, show that the adoption of controlled English for FMS documentation would be such an action. The basic recommendation, therefore, supported by this project, must be that action should be taken to allow

FMS documentation, from policy documents to maintenance manuals, to be written in controlled English.

This general recommendation can be separated into the following more specific recommendations:

First, that the vocabulary for a "Logistics Fundamental English" version of controlled English be developed.

Second, that a basic set of grammar and syntax rules be formulated.

Third, that a dictionary be developed to contain the vocabulary and rules and serve as a basis for training.

Fourth, that training materials be developed to teach FMS documentation authors how to use controlled English.

Fifth, that a specific plan be developed to allow conversion from the current procedure to the new use of controlled English with a minimum loss of time and with a minimum expenditure of resources.

Each of these is further developed below, with specific recommendations for a time-phased implementation. Before beginning this, however, it must be noted that there are three possible scenarios in which Logistics Fundamental English can be developed:

1. The Air Force can make the decision to implement it on USAF cases and proceed accordingly.

2. The proposal can be recommended to either DoD level, or the Joint Logistics Commanders. They in turn can designate an action agency and then proceed accordingly.

3. The proposal can be made as in "2" but with the additional recommendation that the Air Force, and within the Air Force, the Air Force Logistics Command, serve as the implementing pilot/action agency to develop the vocabulary, grammar and documents noted above, coordinating such an effort with the other services' logistics commands.

Though distinct benefits and drawbacks can be found with any of the three proposals, it is believed that maximum benefit would accrue through the adoption of "3" above. This is due to:

1. The initial experimentation and proof are based on USAF experience and validated with allied Air Force personnel.

2. It is believed Air Force FMS cases offer a wider range of technologically diverse projects, (from simple spares support to management and automated systems development to sophisticated weapons sales/support) that would assure development of a vocabulary from a wider sample base.

3. Some experience in dictionary development and terminology standardization in an FMS environment is

already resident in AFLC through their current efforts in the development of logistics management systems for FMS customers, e.g. Peace Sigma.

What then, are the specific steps, and in what time frame, is it recommended to be taken to develop and implement controlled English in FMS documentation?

First, it is proposed that, based on the experience of both Caterpillar Company (20) and NCR (4) there be no commitment to "re-do" existing documents in a wholesale conversion effort. Rather, once the following steps are completed, that, beginning at time "X" all new documents will be written in controlled English. Existing documents would be changed to controlled English only when a major revision was required for other purposes. This would avoid any large commitment of resources to accomplish the revision, allow for phased implementation and allow for a learning curve on the part of both authors and readers. This learning curve on the part of authors is most critical as, based on NCR experience (4) and confirmed by Caterpillar (20), it is from the current authors that the most resistance to the new technique is anticipated. This is only natural in that a "change" in existing methods will be required and this will be perceived, by many, as a threat. Careful planning will be required to gain the support of FMS documentation authors and assure their adequate training.

### Vocabulary Building

The first, and most essential task, will be the development of the basic, controlled vocabulary. This should be viewed as consisting of three types of terms (25:23; 8:27-30):

1. Technical nomenclature: the specific names of a machine, item, part, component, form, or code.

2. Glossary phrases: technical phrases/combinations of words, accepted in logistics and not able to be replaced by a short phrase or clause using defined vocabulary.

3. Controlled vocabulary: this is the essence of the controlled English effort. Each word in the vocabulary has but one meaning. No other word may be used when that meaning is intended.

The technique for building that vocabulary is as follows, and is based on the method employed by NCR (4):

1. A large sample of current FMS documentation would be gathered.

2. A sample paragraph, exhibiting the widest use of different words on the page, would be selected on every page.

3. That paragraph would be entered into a computer data bank (NCR typed the paragraphs in OCR type and entered the data by means of a scanner).



4. Enter both the Caterpillar and NCR dictionaries into the computer.

5. By automated process, analyze the input and produce a listing of each unique word input, the number of times it was used and identifying if the word was also in either the Caterpillar or NCR dictionary.

6. Manually screen the printout to eliminate technical nomenclature and glossary phrases (and typographical errors).

7. Identify and group synonyms.

8. Select one word from each synonym grouping based on

a. frequency of use

b. most "international" form (e.g. error instead of mistake)

c. word used by Caterpillar or NCR.

9. Develop "trial" definitions.

10. Identify two or three trial existing FMS publications and rewrite them with the new vocabulary.

11. Add any new words definitely proved to be necessary by the rewrite.

This would complete the development of the initial vocabulary. Based on NCR and Caterpillar experience it is believed this can be done by two or three people within a six month time frame.



### Grammar/Syntax

It is judged that of the two approaches, the Caterpillar approach, which is much more strict than the NCR approach, should be adopted. Test documents were developed using this approach and results, as shown, bear out the improved understanding and reduced ambiguity than can be attained by this method. Validation of specific sub rules could be made during the same six month period, and by the same personnel, noted above, as required for vocabulary development. In brief, there are ten rules (8:14-21):

1. Make positive (declarative) statements in the active voice.
2. Avoid long/complex sentences.
3. Avoid multiple subjects in one sentence.
4. Avoid too many successive adjectives and nouns.
5. Use uniform sentence structures.
6. Avoid complex past/future verb tenses.
7. Avoid conditional tenses (should, would, might, may). ("Caterpillar Fundamental English is not a polite language, just an effective one [20].")
8. Avoid most abbreviations, contractions and colloquialisms.
9. Use punctuation correctly.
10. Use consistent nomenclature.

## Dictionary

Of the two approaches to the dictionary, Caterpillar's and NCR's, it would appear NCR's is the preferred technique. Notwithstanding the difference in purposes (Caterpillar's for internal, writer's use only, NCR's for worldwide dissemination) the understandability of the definitions themselves is enhanced by phrasing them in the dictionary's own, defined terminology. It is recommended, therefore, that the dictionary be patterned on NCR's and developed as follows:

1. In the initial developed vocabulary (from the section on Vocabulary Building above) when a term is common to either the Caterpillar or NCR dictionary, examine the existing definition.

2. If acceptable, and in the NCR dictionary, use "as is."

3. If acceptable, and in the Caterpillar dictionary, rewrite the definition using the new, controlled vocabulary.

4. If unacceptable, prior to writing a new definition for that term, consider using another term to avoid conflict with either the Caterpillar or NCR definitions/dictionaries. (Such an attitude will, it is believed, aid in acceptance of the new defined terms and gain industry support for the government effort.)

5. If no definition exists, write the definition using only the controlled vocabulary (and, as required, technical nomenclature and glossary phrases).

6. Compile the initial dictionary and coordinate with action agencies (to be specified--recommended agencies could include allied liason offices, other service FMS focal points, industry sources, etc.).

7. Coordinate with sample authors, document writers, etc., encouraging challenges and requests for "new" entries. (A valid request would be indicated when a proposed "new" entry really was not a synonym for an existing term in the dictionary or could not be expressed using dictionary terms.)

Based on NCR experience, the dictionary of vocabulary terms should be able to be completed within one month of completion of the vocabulary building effort as the efforts are occurring simultaneously for most of the time.

In addition to this portion of the dictionary, (vocabulary terms) it is recommended that an additional portion, for the definition of technical nomenclature, in accordance with the structured technique, be included. This is based on the analysis and conclusion, noted above, that such definitions further reduce ambiguity and increase understanding of the documentation. Quite often it is precisely the definition of these terms that are the

source of the misunderstandings and communication failures discussed in Chapters I and II. While the basic vocabulary words and definitions are being developed, it is recommended, therefore, that an additional effort be undertaken to develop this part of the dictionary, so that it would be a more or less complete edition, with both vocabulary terms and technical nomenclature definitions included.

Once published, the dictionary must be looked on as a living document that must be maintained if it is to have continuing value. Particular attention will have to be paid to the first two or three years, for it is in that period, according to both NCR and Caterpillar, that the dictionary will become refined and accepted by users (authors and readers alike). It will only be through the continual update of this dictionary that the full benefit of controlled English in FMS can be realized and the problem noted by Haney in his statement that "The rapidity of etymological shifts is one reason why learning English is so difficult for foreigners [18:296]," can be overcome.

### Training

Both Caterpillar and NCR strongly emphasized the necessity of a strong training program. "The resistance of the writers was a very severe problem [4]" according to NCR. This, due to adequate preparation and materials,

was able to be turned to the program's advantage.

Most of the writers would come to the training 'loaded with ammunition.' They were bringing to the training examples of sentences and passages they were convinced could not possibly be done in this restricted vocabulary. Most of the time--about 90% of the time--I was able not only to do it but to do it fairly easily and that had a very positive effect . . . on most of them . . . except for the diehard who wouldn't accept anything [4].

Training also can offer the chance to surface problems that actually require some changes to the initial vocabulary, grammar, or dictionary. NCR, for example, added some two hundred words to their dictionary as a result of their training (4).

Training materials for DoD use should be developed to provide the in-depth approach needed. Adequate commercial sources exist, if required, to help in this development (such as Caterpillar or NCR itself, Smart Communications, etc.).

NCR offers the largest example of a training effort in this area. They took a period of three months to train a total of 147 technical writers (4). A similar time is believed to be adequate for training of an essential nucleus of writers of FMS documents, i.e. until new documents would be required to be written in controlled English.

Allowing for required coordination cycles, a possible time/phase schedule for the implementation of

controlled English (or Logistics Fundamental English)  
is presented in Table 18.

TABLE 18  
POSSIBLE IMPLEMENTATION SCHEDULE

Event	Schedule--Month #											
	1	2	3	4	5	6	7	8	9	10	11	12
Vocabulary Development												
a. Controlled Vocabulary												
b. Technical Nomenclature												
Dictionary Development												
Grammar/Syntax Formulation												
Develop Training Materials												
Write Trial Documents												
Give Training												
Implement												

#### Development Team

Even as there are several scenarios in which this effort could be done, there are several approaches to the staffing of the development team who would actually do the

development work. Two of those approaches should, perhaps, be mentioned.

First, it is possible that the entire project could be contracted out to one of the several firms with experience in this area. While potentially increasing the cost, it does offer the benefits of maximizing existing experience with a minimum commitment of Air Force (or DoD) personnel. It also presents the possible draw back of losing the commitment of an internally staffed effort, the particular insight of professional logisticians as to their actual needs.

Second, as the entire concept is to further the understanding in the area of FMS, it is possible that a multinational team, under the leadership of two or three U.S. personnel, and, if required, with the assistance (contract) of companies with experience in this area, be charged with the development effort. Based on the response to this thesis topic from allied officers at AFIT and AFLC, it is believed that there is sufficient interest in improving FMS communications, that such a team could be assembled. Ideal composition might include one or two officers from each of the major language areas tested (e.g. from the middle-East, from the far-East, Europe, etc.). This would allow, not only the development of a more universally accepted vocabulary, but obtain a co-commitment on the part of the allied countries to work



for better communications. Additionally, such cooperation could be seen, in itself, as another means of furthering U.S. foreign policy and strengthening ties between the allied nations and the U.S. Also, it would provide the central corps of allied personnel for each participating country to, if desired, begin using Logistics Controlled English for their own publications within and between other countries. Next, of course, it does gain the personnel benefits of contracting out, i.e. a reduction in the number of U.S. personnel required. Lastly, it is possible that allied countries, either directly or through their existing technical documentation cases, such as the Air Force T.O./publications cases, may be willing to share the cost of any required contractor assistance. This further reduces costs to the U.S. government for development and implementation of controlled English if contractor assistance is desired.

The adoption of this second concept, the allied team, is recommended due to the multiple benefits that appear attainable.

#### Other Benefits

In addition to the directly intended and demonstrated benefit of improved understanding that will be attained through acceptance of the recommendation to implement controlled English in FMS documentation, there



are four other benefits that must be mentioned:

1. Improved knowledge/expertise of technical writers. Both NCR and Caterpillar Company noted this as a major benefit i.e., that to write a simplified, more understandable document, the writers had to have a better understanding of the subject matter. Such increased knowledge by DoD FMS personnel, as the author of the document is often instrumental in formulating the policy or procedure itself, cannot help but lead to improved, more efficient FMS procedures.

2. Ease of teaching. One of the areas of difficulty is communicating/teaching logistics system requirements to allied personnel--the mission of DISAM. The establishment of controlled English could substantially ease this task by first, providing a uniform text technique for all documents the allies would be faced with; second, providing a common base language that could be taught to/required of all students, before arrival at DISAM, which would allow improved communication both with the instructors and with fellow students; and, third, provide a media for instructors to use in teaching that would increase the effectiveness of their teaching time, and improve overall understanding reached by the students.

3. Potential automated translation. The use of computers to do translation has long been a goal as well as a problem to international concerns and scientists.

It is a distinct possibility that controlled English may be the solution to that problem. Once Logistics Fundamental English is formulated--one word for one meaning with simple syntax--it will be possible to formulate a word for word correspondence for "controlled German," "controlled Arabic," etc., and, for the first time be able to get a direct "meaningful" translation by an automated process from, for example, Logistics Fundamental English to Logistics Fundamental Japanese, without a loss of meaning.

#### 4. Application to internal U.S. publications.

As was set forward in Chapter II, a major effort is underway in the DoD, by every service, to simplify and improve the readability of their documentation, procedures, manuals, etc. Whether one is concerned with the Air Force "Fog Analysis" or the Army grade level of understanding, such efforts are expensive, often duplicative and, to date, without major verifiable results supported by research. It is possible that the end goal of all these efforts may be found in controlled English. Further studies, based on the success or failure of the effort in FMS may be required and, as such, are recommended. If, however, the results of this research effort can be extrapolated to internal U.S. documents, then the answer to what has been a very expensive problem may have been found.

## APPENDICIES

APPENDIX A  
STRUCTURED SYSTEMS ANALYSIS  
TECHNIQUES

No matter what field of work a person is in there have been advances and changes in that field in recent years. All have been affected by the recent explosion of new knowledge and new technology.

The work of systems analysis and systems design, like the others, has also been affected. The revolution in systems analysis and design began with the growing realization that, as automated systems became larger and more complex, system analysts and designers were less and less able to produce a system that satisfied the user's real needs.

There were many reasons for these shortcomings and there were many proposed solutions to the problems.

Many of these solutions addressed only certain problems, related to specific phases of the system life cycle. For example, some concentrated on problems in testing, others on problems in coding. Though such approaches had limited success, none of them addressed the whole problem. Indeed, they seemed to concentrate on solving problems created in other parts of the life cycle, rather than preventing those problems from occurring.

An approach that has come to address the entire life cycle is one that is known as "Structured Analysis."

The principles of Structured Analysis are relatively simple:

First, there are definite steps or phases in the creation of an improved system.

Second, there are definite products for each phase.

Third, these products can be developed using techniques that assure user understanding at critical points, allow for ease of maintenance, reduce ambiguity and redundancy, and produce a much shorter document than ever before.

Following these principles allows the production of documents that are graphic (vs. narrative), partitioned (in small, easily understood pieces), rigorously defined (vs. ambiguous), maintainable (with minimal redundancy), concise and readable (27:112).

The tools by which Structured Analysis achieves this are:

First, the Data Flow Diagram (DFD). Figure 2 is an example of such a diagram.

Note that the DFD is entirely a picture of "what" is happening. It shows processes (bubbles) and the data/material flows (arrows) that connect the processes to each other. It shows where the data/material first comes from and where it finally goes to (rectangles). It shows files or storage points (straight lines) used by the processes.

There are strict rules for the development of these diagrams. Based on the psychological research of George Miller on human information processing, there is an attempt to limit the DFD to seven ( $\pm 2$ ) processes (43:62).

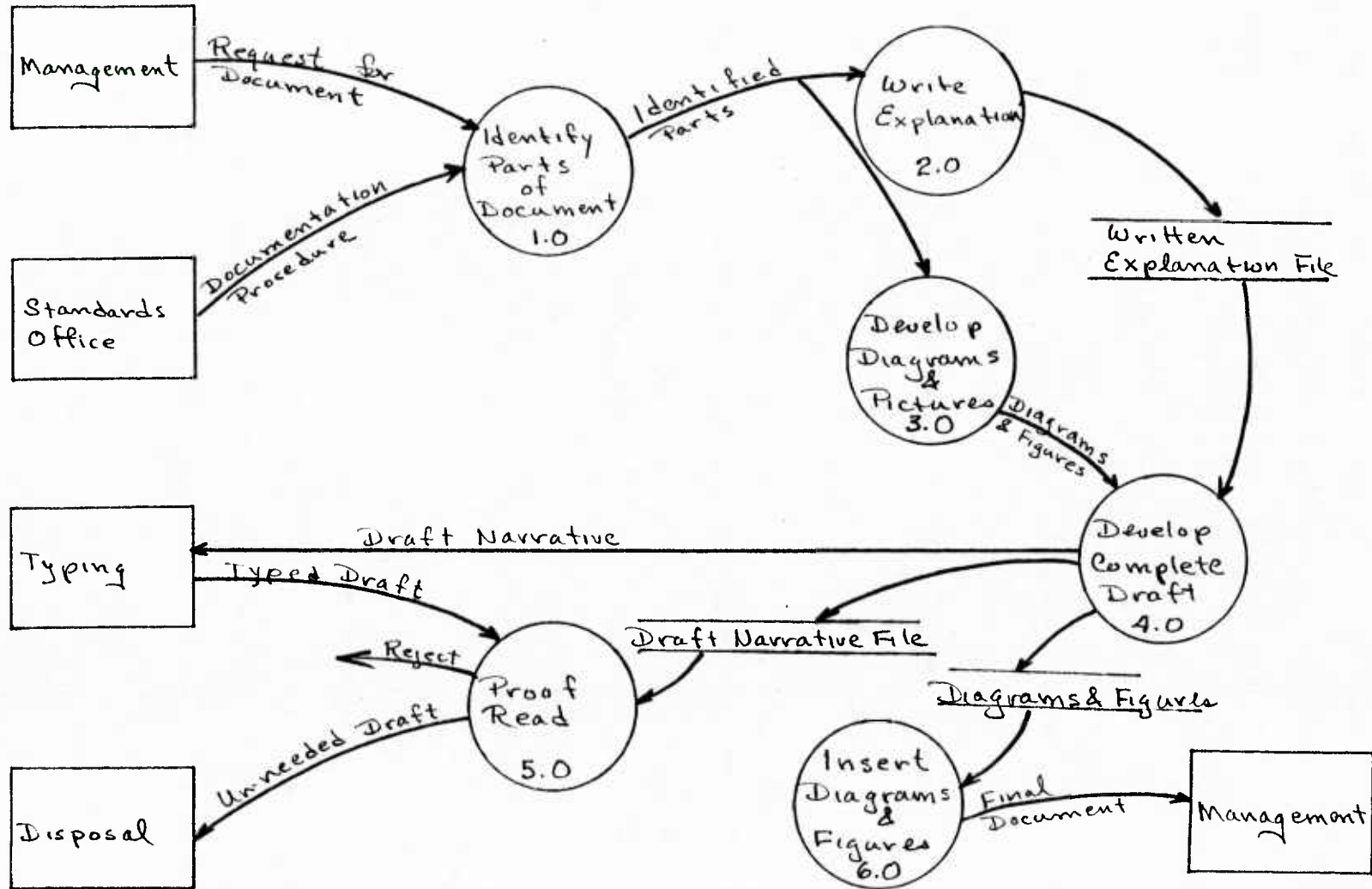


Fig. 2. Upper Level Data Flow Diagram

It is intentionally simple and avoids the depiction of the many minute details of every process. It allows for such detail to be added, in a "top-down" manner, only when needed. This is done by expanding or partitioning the process into its component, more detailed parts.

Thus, Figure 3 shows the "sub-processes" that go to make up bubble #5 in the above DFD.

Processes are partitioned in this manner until they can be totally "described," in structured English, a decision table or decision tree, on a single 8½ x 11 piece of paper.

This helps avoid the lengthy narrative that caused the original problem, and is one of the most important "enforcement" rules of structured analysis. For, as DeMarco (13:10) states, "When given a choice between a picture and a thousand words, most analysts opt for a thousand words."

The diagram may not appear "finished" or "neat" in that it includes hand lettering and hand drawn flows (arrows). This is in accordance with the technique of DeMarco(13). It allows concentration on content vs. form and greatly reduces the time and money required to produce a finished product. It also greatly enhances document maintainability.



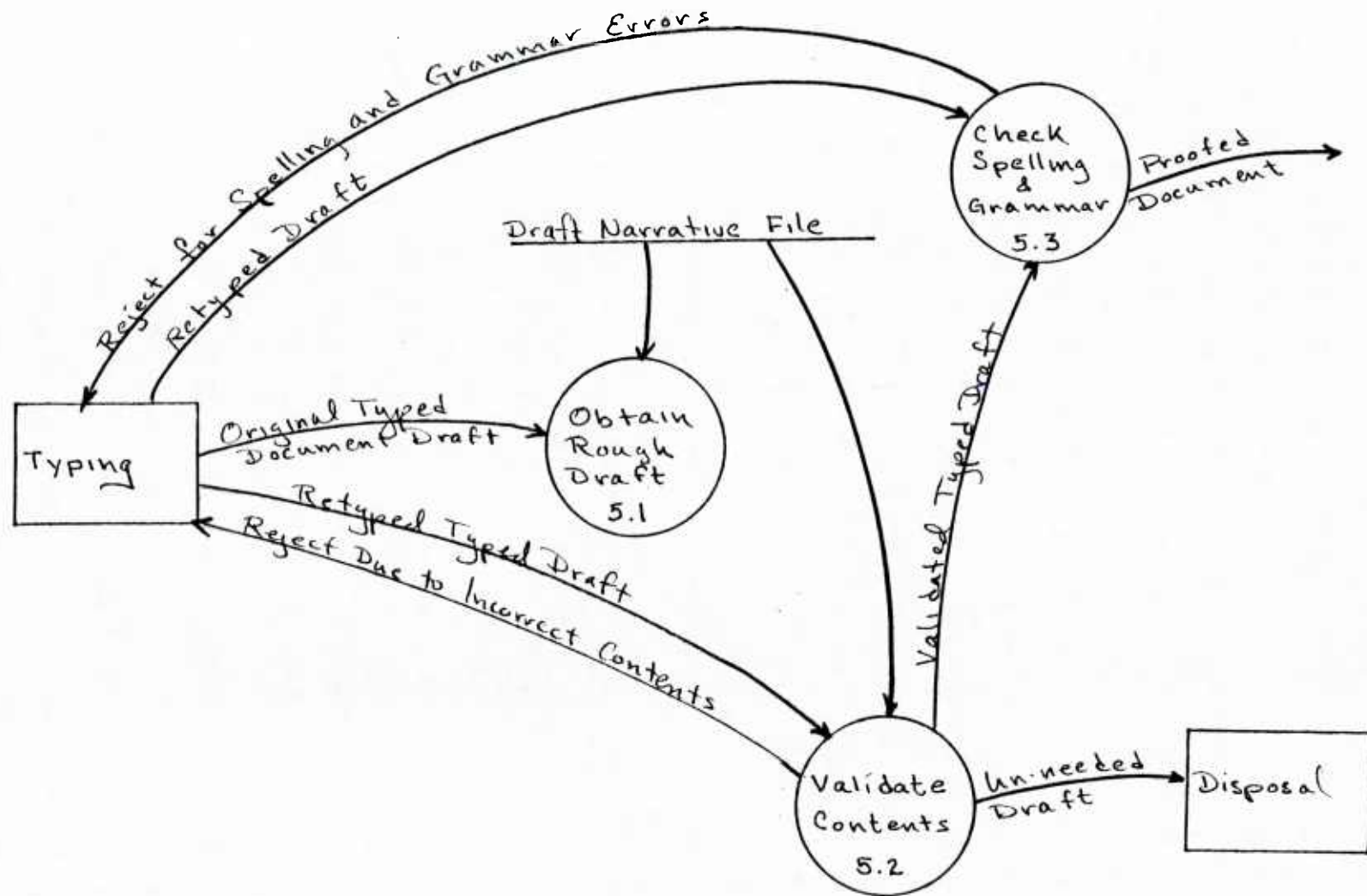


Fig. 3. Bottom Level Data Flow Diagram

The second tool used is the Data Dictionary. Here are contained the definitions of every data flow, file and element used by the process. And these definitions are given in a non-ambiguous, non-narrative manner. An essential part of these definitions is the inclusion of the relationship of a definition's component parts. Figure 4 shows a definition. In the actual Data Dictionary, the components are replaced by symbols. Figure 5 illustrates this same definition as it might appear in the Data Dictionary with symbols replacing some of the words.

Term: Draft Narrative  
is composed of the following:

- Originator's Name and
- Originator's Phone Extension and
- Name of the Document and
- For each section of the document  
the section title, as an option, and  
format instructions, and  
section text and
- Either a priority or routine need  
indicator and
- Any required due date and
- As an option, any other special  
instructions to the typist.

Fig. 4 Sample Definition

It is important to note that this technique leaves the user relatively free to use whatever terms have come to be customary in his/her service or command, as long as they are defined and, in turn, each of the sub-components are defined with equal precision, down to the bottom,

Term: Draft Narrative

Originator's Name +  
Originator's Phone Extension +  
Name of Document +  
\*(Section titles) +  
format instructions +  
section text\* +  
#priority indicator  
routine indicator# +  
required due date +  
(Special instructions)

Fig. 5 Sample Definition with Symbols

or self evident level. The technique, by assuming this nominalist vs. rationalist approach avoids many of today's arguments over whose word is "right" (13:129-147).

The third and last tool discussed here is the Mini-Specification. Structured Analysis physically restricts the size of these descriptions to a single 8½ x 11 piece of paper, hence the name: Mini-Specification. There is a Mini-Spec for every bottom level process (a "bubble" that is not further broken out into more bubbles). When any process has been decomposed to a point known as "the bottom level," it is then completed by defining what is done to convert the input to the output. This is done in one of three ways.

First, if the process is relatively simple, it is described in what is known as Structured English.

Figure 6 shows an example of such a description for process (bubble number) 5.2 of Figure 3, Validate Contents.

For each Rough Draft and matching Typed Draft received:\*

1. Compare the contents of the Typed Draft with the Rough Draft
2. Where contents differ:
  - Underline in red those parts of the Rough Draft that differ from the Typed Draft
  - Return to Typing for Correction
  - Refile the Rough Draft
  - On receipt of the retyped Typed Draft
  - Repeat step 1
3. Otherwise (contents agree)
  - Discard the Rough Draft
  - Mark the typed copy as valid
  - Initial the Top left corner of the Typed Draft
  - Mark the Julian Date and Local Time (24 hour basis) underneath your initials
  - Forward the Validated Typed Draft for spelling and grammar check.

\*Capitalized words are generally used to indicate words/terms that should be defined/found in the Data Dictionary.

Fig. 6 Mini-Spec for 5.2

(Note: There are many forms that Structured English can take. These vary from a rigid system known as "Pseudo-Code" (from its resemblance to computer code) to the much more relaxed style used here. This latter approach is to tailor it to the user. Most users relate far better to a less rigid form that enhances readability and clarity without sacrificing brevity and a lack of redundancy.)

Even in this form it can be seen that structured English uses only three grammatical constructs: sequence, decision and repetition to express all directions. This

is based on the research (in software) of E. W. Dykstra, based on the Boolean Algebraic proof that all set communication can be done with these three operations (13:184).

Next, if the process offers several courses of action that must be defined, these may be shown in a decision table.

Figure 7 is an example of such a table for process (bubble number) 5.3 of Figure 3, Proof Read for Spelling and Grammar.

Lastly, multiple course of action may, as an alternate, be shown in a decision tree, instead of a decision table. Process 5.3 of Figure 3, shown in Figure 7 as a decision table is shown in Figure 8 as a decision tree.

On receipt of the Validated Typed Draft from 5.2, or the retyped draft from typing,  
 1. Check Spelling and Grammar  
 2. Determine which of the following conditions exists:

Spelling errors:

N: None

M-1: Minor Typographical, no change in word length, less than 5 errors total

M-2: Minor, but change in word length, or more than 5 errors total, but less than 10

Maj: More than 10 errors total

Grammar errors:

N: None

M 5: Less than 5 errors in verb tense, or person, no other errors

M 6: More than 5 errors in verb tense, or person, but less than 8, no other errors

MSC: More than 8 errors in verb tense or person or any other grammatical error

3. Take the action indicated below.

Condition	1	2	3	4	5	6	7	8	9	10
Spelling Error	N	M-1	M-2	MAJ	N	M-1	M-2	MAJ	N or Any	N or Any
Grammar Error	N	N	N	N	M 5	M 5	M 5	M 5	M 6	MSC
Action										
Send for Retype				x				x	x	x
Make Pen & Ink Change & Forward		x	x		x	x	x			
Forward to Next Process	x									

Fig. 7 Mini-Spec for 5.3, Decision Table

On receipt of Validated Typed Draft from 5.2 or retyped draft from Typing: 1) Check Spelling and Grammar; 2) Determine which of following conditions exists:

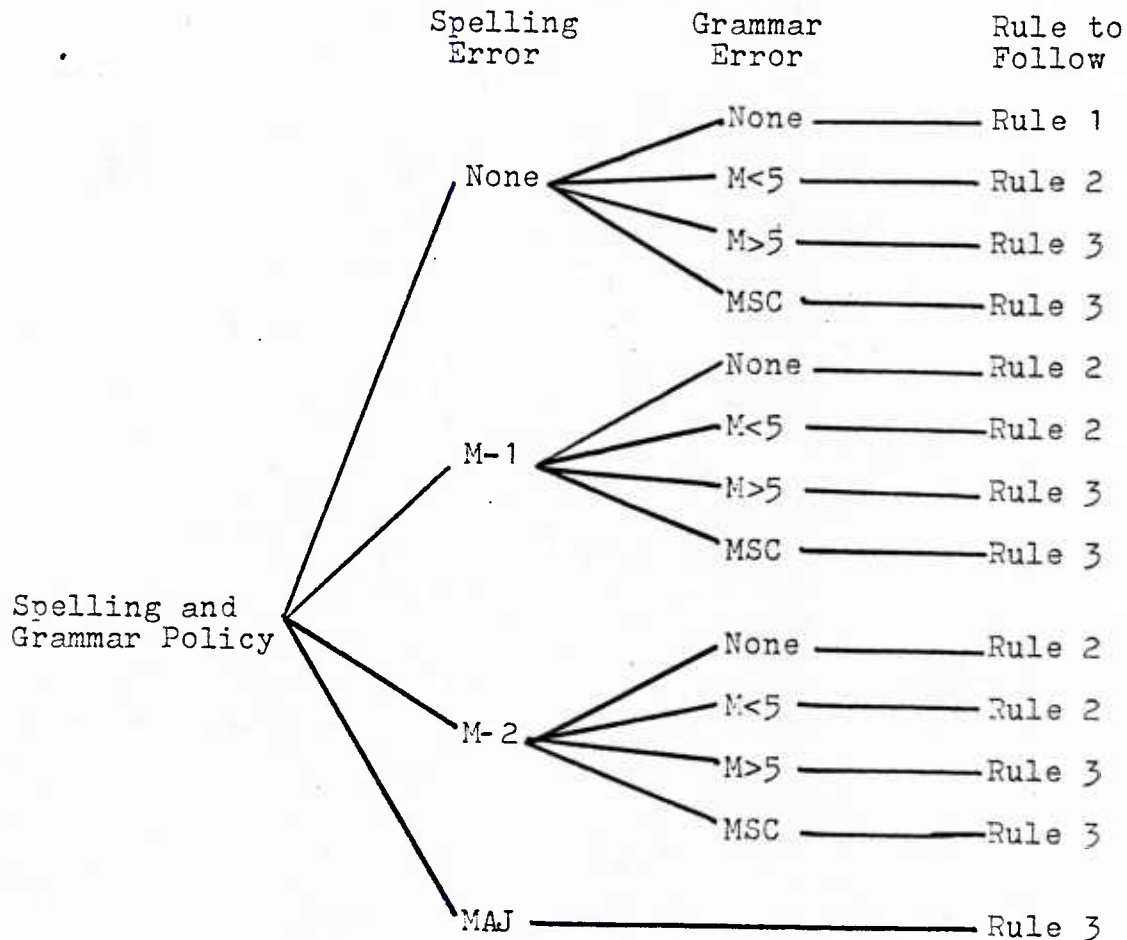
Spelling Errors: M-1, Minor, No change in word length, <5  
M-2, Minor, Change in word length, >5 but <10  
Maj, >10 errors.

Grammar Errors: M<5, In verb tense or person, no others.

M 5, Between 5 and 8 in verb tense or person

MSC, Any others or >10 tense or person errors.

Follow the rule:



Rule 1: Forward to next process.

Rule 2: Make Pen and Ink corrections and forward to next process.

Rule 3: Correct and send back for retype.

Fig. 8 Mini-Spec for 5.3, Decision Tree

APPENDIX B  
CONTROLLED ENGLISH  
TECHNIQUE



There have been several attempts over the past years in several disciplines, to simplify the English language. A method often explored is to simplify by reducing the number of words available for use. One of the most successful efforts along these lines is that initiated by the Caterpillar Tractor Company.

Caterpillar is a large manufacturer with international operations. It was faced with the job of providing information on service and parts, on thousands of pieces of equipment and operations, to its customers, in over fifty different languages. In looking for a solution to this problem, Caterpillar examined, and rejected, many systems (37:1). Finally they developed their own system. The basic concept they took was:

1. If international language experts agree that 850 words (in Basic English) can be taught to anybody, it would not make any difference what words are used.
2. Once the particular field of communication is well defined, the needed vocabulary can be selected to fill that communication need.
3. Whatever can be illustrated (by photos, diagrams, charts, symbols, etc.) need not be included in the written vocabulary. An illustrated Parts Book, for example, obviates the need to teach any parts nomenclature or tools.
4. The fundamental vocabulary need not be taught as a complete language. Visual recognition of the words, e.g. "READING and UNDERSTANDING" is all that is needed to communicate.
5. Last, but more important: The language usage must be structured very simply so that the audience understands a complete sentence composed of words from the fundamental vocabulary [37:1-2].

Next they identified the target population. Who was this language to be used by? Someone literate in their own language (reading and writing), a trained mechanic with one to two years experience, some of it with Caterpillar products. And that is all. With only those prerequisites, the Caterpillar Basic Product Nomenclature book (7) (for technical terms and tool names), and the basic thirty lesson course, Caterpillar proposed that anyone could read and understand service and maintenance documents. One single version of a document would be used worldwide, by all nationalities. In July 1971 Caterpillar had completed all preparations for what the company called "Caterpillar Fundamental English." A basic vocabulary of eight hundred words had been selected. The words included four hundred fifty nouns (terms and things), seventy verbs (action words), one hundred eighty adjectives (characteristics) and one hundred miscellaneous articles, pronouns, prepositions and numbers. The words had been selected to be specially adapted to the maintenance and service field. No word had two meanings. International forms, when available, were selected over pure anglo-germanic roots. Most irregular verbs were eliminated and most words with duplicate meanings were dropped. Additionally, writer's guide materials had been developed and a course formulated to teach Caterpillar Fundamental English abroad (37:2-3). In 1971, the company

implemented the program. By 1978, they reported complete success (23:39) with two commercially licensed versions available and research underway by several companies to develop like products.

Caterpillar reports one other benefit, besides clearer international communications. Even as structured analysis forces the analyst/writer to show, describe and define a work as never before, in order for it to be clear, non-ambiguous, etc., and thus forces the writer to have a better understanding of his subject matter, controlled English also, by requiring simplification of texts, demands a deeper technical proficiency of the writer than was required before. A side benefit, therefore, is the education/training of document authors in their own fields (37:3).

The correct "naming" of the language used by Caterpillar may cause some confusion. Caterpillar calls it "Caterpillar Fundamental English." Their U.S. licensee calls it "Basic 800." The international licensee calls it "ILSAM" (International Language for Service and Maintenance). This thesis shall adopt the term used by Kirkman (23:38) and, accepting that the basic ends of the language are attained by "controlling" the allowable words, will use the common name "controlled English" and, except for this brief introduction not use the proper (and copyrighted) names.

What does controlled English look like? What are the eight hundred basic words used? (The following examples and vocabulary have been provided, and are copyrighted by, Caterpillar Tractor Co. Permission to use them has been granted for the specific purpose of the research work of this thesis. No further use of the vocabulary or specific texts is intended nor authorized by the Caterpillar Tractor Co. without specific negotiation/authorization for such use.)

Controlled English looks like--English, because that is what it is. To the English proficient reader, there may be little, immediately detectable difference. In fact, when Caterpillar distributed its first documents in controlled English, no announcement was made and the difference was not detected (37:3). The following examples are in controlled English: Figure 9 is the Introduction to a Caterpillar service manual (6:2); Figure 10 and 10A are instructions for the removal and installation of fuel injection pumps from Caterpillar engines (6:70); Figure 11 and 11A are instructions for removal and installation of turbo charges (note dual English measurement/metric instructions) (6:110).

Figure 12 is an excerpt from a training briefing given in controlled English, on a specific Caterpillar engine (21:33). (Note the instructions to the briefer, in italics, also in controlled English.)



## INTRODUCTION

This publication has instructions and procedures for the subject on the front cover. The information, specifications, and illustrations in this publication are on the basis of information that was current at the time this issue was written.

The "Alphabetical Index" is a list of all components and service operations in this manual section. It gives page numbers and also the operations numbers as found in the "Service Index".

The "Service Index" is a list of all component operations found in this manual section. All operations in the column "Component Operation" are removal and installation instructions, unless other descriptions are given for the operation. The arrangement of the components in this list is by location on the machine or engine. The column "Other Needed Operations" gives the number of all other component operations that are necessary to do the respective job.

Correct operation, maintenance, test and repair procedures will give this product a long service life. Before starting a test, repair or rebuild job, the serviceman must read the respective sections of the Service Manual, and know all the components he will work on.

Your safety, and the safety of others, is at all times very important. When you see this symbol  or this symbol  in the manual, you must know that caution is needed for the procedure next to it. The symbols are warnings. To work safely, you must understand the job you do. Read all instructions to know what is safe and what is not safe.

It is very important to know the weight of parts. Do not lift heavy parts by hand. Use a hoist. Make sure heavy parts have a good stability on the ground. A sudden fall can cause an accident. When lifting part of a machine, make sure the machine has blocks at front and rear. Never let the machine hang on a hoist, put blocks or stands under the weight.

When using a hoist, follow the recommendation in the manual. Use correct lift tools as shown in illustrations to get the correct balance of the component you lift. This makes your work safer at all times.

Make reference to GENERAL INSTRUCTIONS.



## FUEL INJECTION PUMPS

### REMOVE FUEL INJECTION PUMPS

11-1251

1. Remove dampers from fuel injection lines.
2. Disconnect the fuel line (1) for the pump to be removed by removing nut (2). Put a protective cover over the open end of fuel line. Move the fuel lines (1) out of the way.
3. Remove the bolts (3).
4. Lift the pump body (5) straight up and remove body.
5. Slide the plunger (4) from yoke of lifter. Remove the plunger (4). Keep the plungers with their respective pump bodies.

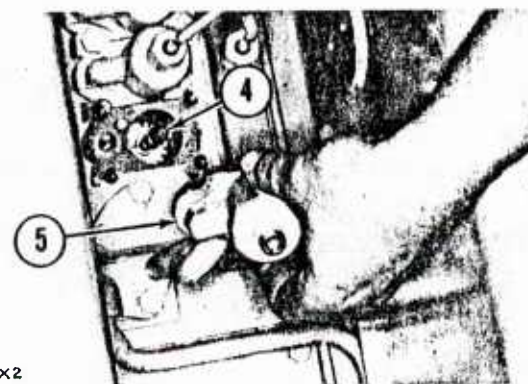
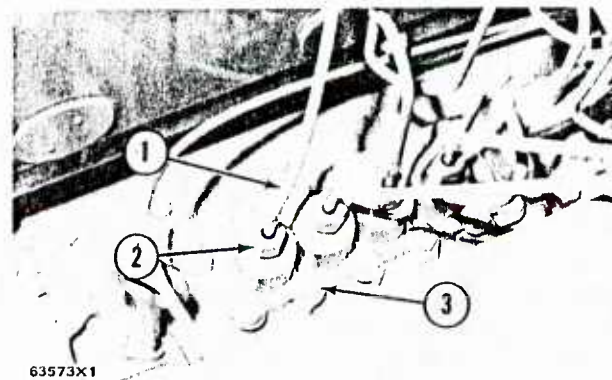


Fig. 10. Instructions for Removal of Fuel Injection Pumps

## INSTALL FUEL INJECTION PUMPS

12-1251

1. Turn the pump plunger until tooth (2) of plunger is in alignment with mark (1) on rack. Install the plunger (3) by sliding end into yoke of lifter.

**CAUTION:** Be careful when installing pump barrels and plungers. Do not put plunger of one pump in barrel of another pump.

2. Install new seals. Install the pump body and barrel carefully over plunger and dowels on injection pump housing.
3. Install the bolts. Tighten bolts first one then another a small amount to at time starting alternately, with the two nearest the fuel rack. Tighten to  $32 \pm 5$  lb.ft. ( $4.4 \pm 0.7$  mkg).
4. Remove covers from fuel lines. Connect fuel lines. Tighten fuel line nut to 25 to 35 lb.ft. (3.5 to 4.8 mkg).
5. Install dampers on fuel lines.

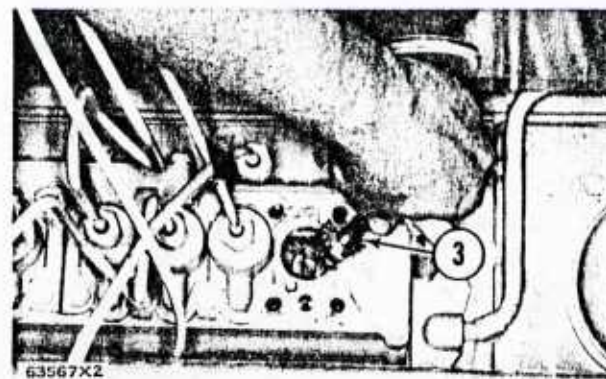
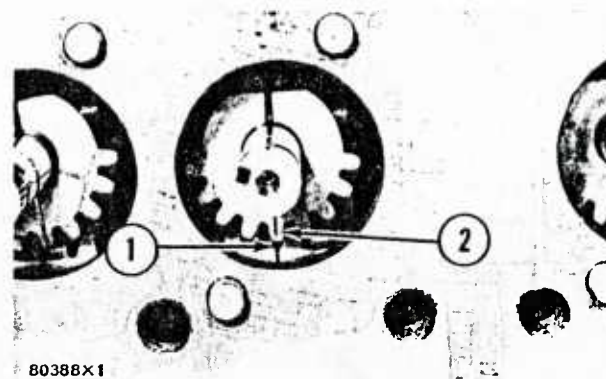


Fig. 10A. Instructions for Installation of Fuel Injection Pumps

## TURBOCHARGERS

### REMOVE TURBOCHARGERS

11-1052

start by:

- a) remove turbocharger heat shield (Marine Engines only)
- b) remove air cleaner housings
1. Remove the line (2) for oil supply to the turbocharger. Remove return line (4) for oil from turbocharger.
2. Remove shield (3) from turbocharger (Marine Engines only).
3. Loosen clamp (1) that holds coupling to exhaust elbow (Marine Engines only).
4. Loosen clamp that holds elbow to the after-cooler.
5. Install covers in the openings for oil in turbocharger. Install a 3/8"-16 NC forged eyebolt in top of turbocharger.
6. Remove bolts that hold turbocharger to exhaust manifold.
7. Fasten a hoist and remove turbocharger. Weight is 50 lb. (23 kg).

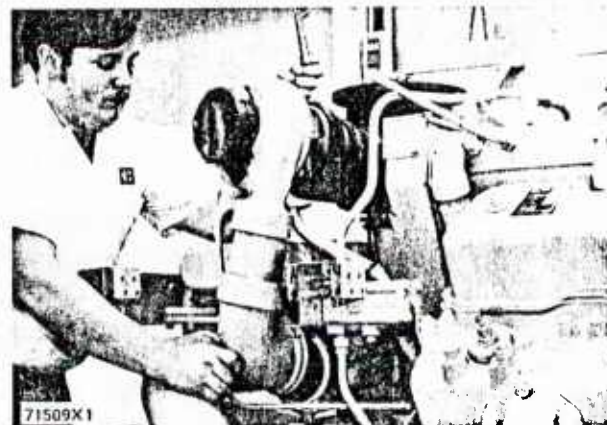
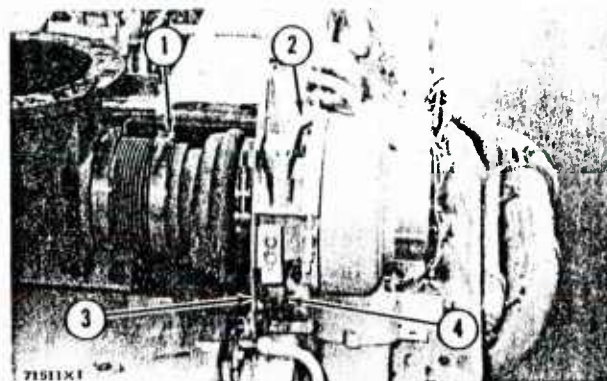


Fig. 11. Instructions for Removal of Turbo Chargers



**INSTALL TURBOCHARGERS****12-1052**

1. Put a 3/8"-16 NC forged eyebolt in top of turbocharger. Fasten a hoist and put turbocharger in position on engine.
  2. Put 9M3710 Anti-Seize Compound on threads of bolts (1) that hold turbocharger to exhaust manifold. Install the bolts and nuts. Tighten the bolts to a torque of  $40 \pm 4$  lb.ft. ( $5.5 \pm 0.6$  mkg).
  3. Tighten clamp that holds elbow to after-cooler.
  4. Remove the covers from openings and install the supply line and return line (2) for oil to turbocharger.
  5. Install the shield for turbocharger. Tighten the clamp that holds coupling (Marine Engines only).
- end by:
- a) install turbocharger heat shield (Marine Engines only)
  - b) install air cleaner housings

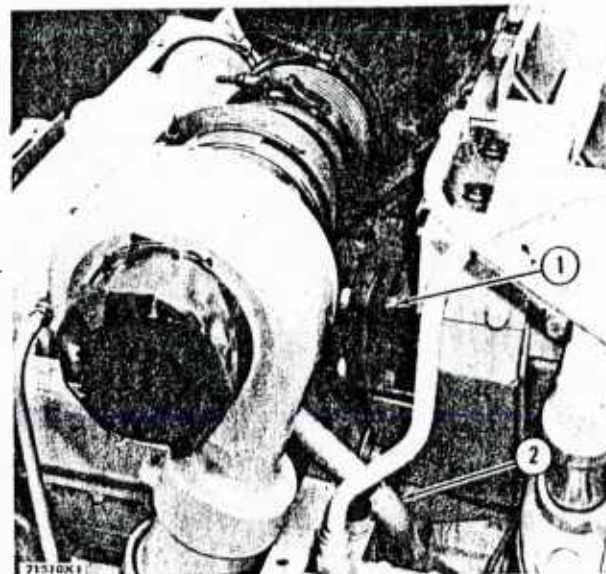
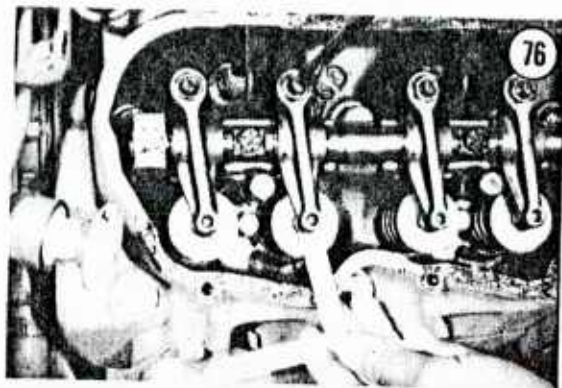


Fig. 11A. Instructions for Installation of Turbo Chargers



Adjust the valve clearance with the adjustment screw and a feeler gauge.

Make valve adjustments while the engine is stopped and cold. Valve setting is .015 in. (0.40 mm) for inlet valves and .25 in. (0.65 mm) for exhaust valves. The crankshaft must be turned to four positions to get the correct valve setting.

First, turn the crankshaft until No. 1 piston is at the top center mark (TDC-1) of the compression stroke. Adjust the valves for cylinders No. 1 and 2. Then turn the crankshaft 180 degrees to the next "valve setting" mark (VS). Adjust the valves for cylinders No. 7 and 3. Next turn the crankshaft 180 degrees to top center (TDC-1). Adjust the valves for cylinders No. 4 and 5. Then turn the crankshaft 180 degrees (to VS mark) and adjust the valves for cylinders No. 6 and 8.

*NOTE: Top center of No. 1 piston on the compression stroke is the starting point. The No. 1 piston is on top center when the TDC-1 mark on the pulley (or vibration damper) is in alignment with the pointer. It is on the compression stroke when No. 1 and No. 2 inlet and exhaust valves are closed. (The rocker arms are free to move up and down by hand and the push rods are at their lowest position.)*

Fig. 12. Excerpt from a Training Briefing

Most readers note little, if any difference, in the controlled English texts. To some they may seem a bit stilted, to others they may seem a little simple, to others yet they appear almost "legalistic." One thing is certain though, (to Caterpillar, at least) that regardless of appearance, the end result is better understanding. The basic vocabulary used to attain this is in Figure 13 (by part of speech) (8:45-50) and Figure 14 (in alphabetical order) (8:51-55). Each term is precisely defined in a dictionary that contains definitions of the words. No other definition or intended meaning is allowed. An excerpt from the dictionary is found in Figure 15 for all terms beginning with the letter "I" (5:12-13).

To see how ambiguities are eliminated by this technique one has only to look at the definition of the term "issue." Yet without such precision and control, in normal narrative documents a person can "issue" an instruction, the interpretation of which can become an "issue" of discussion, especially if there is more than one "issue" of the instruction.

The heart, then, of the system, is the controlled English vocabulary. Like structured analysis, though, controlled English is more than just a set of vocabulary rules and restrictions. It is a system composed of integral parts, the complete parts are vocabulary, grammar, syntax. It involves the three steps of language simpli-

**VOCABULARY OF CATERPILLAR FUNDAMENTAL ENGLISH**  
**listed by part of speech**

**450 Terms & Things (Nouns)**

<b>A</b>	chart	<b>D</b>	estimate
ability	check	damage	example
access	circle	danger	exchange
accessory	circuit	day	exhaust
accident	circumference	date	expansion
accuracy	claim	dealer	explanation
action	clearance	decrease	eye
adapter	code	defect	
addition	collar	degree	<b>F</b>
adjustment	color	delay	face
advantage	column	delivery	facility
air	combination	demonstration	factor
alignment	combustion	department	factory
amount	communication	deposit	failure
amperage	comparison	depth	field
analysis	compartment	description	filler (cap, tube, etc.)
angle	compensation	design	finding
application	component	detail	finger
area	compression	development	fire
arm	concentration	diagnosis	fit
arrangement	condition	diagram	floor
article	conductor	dial	flow
assembly	connection	diameter	fluid
assistance	construction	difference	foot
atmospheric	consumption	dimension	footnote
average	contact		

Fig. 13. Sample List of Basic Vocabulary by Part of Speech

## 70 Actions (Verbs)

## Basic Actions

be, is, are, was were  
 become, became  
 can  
 cause, caused  
 come, came  
 do, done, did  
 fall, fell  
 feel, felt  
 find, found  
 get, got  
 give, gave, given  
 go, went, gone  
 have, has, had  
 hear, heard  
 hold, held  
 keep, kept  
 know, knew, known  
 learn, learned  
 let,  
 look, looked  
 make, made

activate, activated  
 adapt, adapted  
 add, added  
 adjust, adjusted  
 approve, approved  
 assemble, assembled  
 bend,  
 break, broke, broken  
 burn, burned, burnt  
 cancelled  
 change, changed  
 charge, charged  
 check, checked  
 clean, cleaned  
 close, closed  
 connect, connected  
 control, controlled  
 correct, corrected  
 count, counted  
 cut  
 damage, damaged

## Work Actions

grind, ground  
 hang, hung  
 heat, heated  
 hit,  
 improve, improved  
 increase, increased  
 inspect, inspected  
 install, installed  
 lift, lifted  
 loosen, loosened  
 limit, limited  
 lower, lowered  
 machine, machined  
 measure, measured  
 mix, mixed  
 multiply, multiplied  
 open, opened  
 operate, operated  
 order, ordered  
 permit, permitted  
 prevent, prevented

Fig. 13. (Continued)

## 180 Characteristics (Adjectives &amp; Adverbs)

acceptable	fabricated	old, older	technical
adaptable	far, farther, farthest	open	telescopic
approximate,-ly	fast, faster, fastest	opposite	temporary,-ily
atmospheric	fine	optional	tensile (strength)
automatic,-ally	finished	original	testing
available	flammable	outside	thick,-er
axial,-ly	flat	own	thin, thinner, thinnest
	flexible		thorough,-ly
back	forged	parallel	tight,-ly, tighter, tightest
backwards	former,-ly	permanent,-ly	treated
bad, badly	forward	permissible	typical
basic,-ally	free,-ly	pneumatic,-ally	
bent ..	freezing	positive,-ly	use, usable
best, better	front	possible, possibly	
braking	full,-y	practical,-ly	variable
		predictable	vertical,-ly
canceled	general,-ly	present	visual,-ly
careful,-ly	good, better, best	preventive	
charging	gradual,-ly	primary	warm, warmer
clean,-ly		probable, probably	weak,-er, weakest
clear,-ly	hard, harder, hardest		welding
clockwise	hardened	radial,-ly	wet
closed	heavy,-ily, heavier	rapid,-ly	wide,-r, widest
coarse	helical	rated	worn
cold, colder, coldest	high,-ly, higher	ready	wrong,-ly
common	hollow	real,-ly	
complete,-ly	horizontal,-ally	rebuilt, rebuildable	yield
constant,-ly	hot, hotter, hottest	regular,-ly	
cool,-er, coolest	hydraulic,-ally	reinforcement	

Fig. 13. (Continued)

# 100 Small Words & Numbers

a, an  
about  
above  
according  
across  
after  
again  
against  
all  
almost  
along  
already  
also  
and  
any  
apart  
around  
as  
at  
away  
  
back  
because

for  
from  
  
here  
how  
  
if  
in, inner  
including  
instead  
into  
  
just  
  
less  
like  
  
many  
minus  
more, most  
much

per  
plus  
  
several  
since  
so  
some  
soon  
still  
  
than  
that, those  
the  
then, there  
this, these  
through, thru  
to  
together  
too  
toward

Fig. 13. (Continued)

Parts of Man's Body (Nouns)		Numbers		Order	Pronouns
arm	head	1	one	first	
back	heel	2	two	second	I
body	jaw	3	three	third	he, his
ear	knee	4	four	fourth	it, its
elbow	leg	5	five	fifth	they, their
eye	lip	6	six	sixth	we, our
face	mouth	7	seven	seventh	you, your
finger	neck	8	eight	eighth	
foot, feet	nose	9	nine	ninth	
hair	shoulder	10	ten	tenth	
hand	toe	0	zero		
Colors					
black	orange				
blue	purple				
brown	red				
gray	white				
green	yellow				

Fig. 13. (Continued)



A	arm around arrangement article as assemble, assembled assembly assistance at atmospheric automatic, automatically available average away axial, axially	both bottom braking branch brass break, broke broken brown burn, burned burnt but by
	B	C  came (come) can canceled capacity carbon careful, carefully cause, caused caution center chamber change, changed characteristic charge charged charging chart check, checked circle circuit circumference claim clean, cleaned cleanly clear, clearly clearance clockwise close, closed coarse
a, an ability about above acceptable . access accessory accident according accuracy across action activate, activated adapt adaptable adapted adapter add, added addition adjust adjusted adjustment advantage after again against air alignment all almost along already also amount amperage an (a) analysis and angle any apart application approve, approved approximate, approximately are area	back backward backwards bad, badly balance ball basic, basically basis be, became because become before behind below bend, bent best (good) better (good) between beyond bill black block blue body, bodies book boost bore	

Fig. 14. Basic Vocabulary in Alphabetical Order

code  
cold,  
  colder  
  coldest  
collar  
color  
column  
combustion  
come  
common  
communication  
comparison  
compartment  
compensation  
complete,  
  completely  
component  
compression  
concentration  
condition  
conductor  
connect,  
  connected  
connection  
constant,  
  constantly  
construction  
consumption  
contact  
container  
content  
contract  
control,  
  controlled  
conversion  
cool,  
  cooler  
  coolest  
cooling  
copy  
core  
corner  
correct,  
  corrected  
  correctly  
correction  
corrosion  
cost  
count  
counted  
counterclockwise  
cover

crack  
cross section  
cubic  
current,  
  currently  
curve  
cushion  
customer  
cut  
cycle

## D

damage  
damaged  
danger  
dark,  
  darker,  
  darkest  
date  
day  
dealer  
debris  
decrease  
decreased  
deep,  
  deeper  
  deepest  
defect  
degree  
delay  
delivery  
demonstration  
department  
deposit  
depth  
description  
design  
desired  
destroy,  
  destroyed  
detail  
development  
diagnosis  
diagram  
dial  
diameter  
did  
difference  
different,  
  differently

difficult  
dimension  
direct,  
  directly  
direction  
dirt  
dirty,  
  dirtier  
  dirtiest  
disassemble,  
  disassembled  
disassembly  
discharge,  
  discharged  
disconnect,  
  disconnected  
displacement  
distance  
distortion  
distribution  
divide,  
  divided  
do,  
  done  
double  
down  
drain,  
  drained  
drawing  
drift  
drill,  
  drilled  
drive,  
  driven  
drop  
dry,  
  drier,  
  driest  
during  
dust  
duty

## E

each  
ear  
early,  
  earlier  
  earliest  
easy,  
  easier  
  easiest

Fig. 14. (Continued)

easily  
edge  
effect  
efficiency  
eight, eighth  
either  
elastic  
elbow  
electric,  
electrically  
electricity  
electronic,  
electronically  
element  
emergency  
empty  
end  
energy  
engage,  
engaged  
enough  
equipment  
equip,  
equipped  
error  
especially (special)  
estimate  
etc.  
even,  
evenly  
every  
exact,  
exactly  
example  
except  
exchange,  
exchanged  
excluding  
exhaust  
existing  
expansion  
expected  
explanation  
extend,  
extended  
extra  
eye

## F

fabricate,  
fabricated

face  
facility  
factor  
factory  
failure  
fall (fell)  
far,  
farther  
farthest  
fast,  
faster  
fastest  
fasten,  
fastened  
feel,  
felt  
fell  
field  
fifth (five)  
fill,  
filled  
filler  
find (found)  
finding  
fine  
finger  
finish,  
finished  
fire  
first  
fit,  
fitted  
five, fifth  
flammable  
flat  
flexible  
floor  
flow,  
flowed  
fluid  
flush,  
flushed  
follow,  
followed  
foot, feet  
footnote  
for  
force  
forged  
form

former,  
formerly  
formula  
forward  
found (find)  
four,  
fourth  
free,  
freely  
freezing  
frequency  
friction  
from  
front  
full,  
fully  
future

## G

gas,  
gases  
gauge  
gave (give)  
general,  
generally  
get (got)  
give (gave)  
given  
go,  
gone  
good  
got (get)  
grade  
gradual,  
gradually  
gravity  
gray  
green  
grind, ground  
grip  
ground  
group  
guide

## H

had  
hair  
half  
hand

Fig. 14. (Continued)



loosely  
loosen,  
loosened  
loss  
lost  
loud  
louder  
loudest  
loudly  
low,  
lower  
lowest  
lowered  
lubricant  
lubrication

## M

machine  
machined  
made (make)  
mail  
main,  
mainly  
maintenance  
make (made)  
man, men  
manager  
management  
manual,  
manually  
many  
marine  
mark  
material  
maximum  
meaning  
measure,  
measured  
measurement  
mechanical,  
mechanically  
medium  
men (man)  
meter  
method  
minimum  
minus  
minute  
miscellaneous  
mix,  
mixed  
mixture  
mobile

model  
modification  
modulation  
moment  
month  
more  
most  
mouth  
move,  
moved  
movement  
much  
multiplication  
multiply,  
multiplied  
must

## N

name  
narrow,  
narrower  
narrowest  
natural,  
naturally  
near,  
nearer  
nearest  
necessary,  
necessarily  
neck  
need,  
needed  
negative  
neither  
neutral  
never  
new,  
newer  
newest  
next  
nine, ninth  
no  
No. (number)  
noise  
nomenclature  
normal,  
normally  
nose  
not  
note  
nothing  
now  
number (No.)

## O

odor  
of  
off  
old,  
older  
on  
one (first)  
only  
open,  
opened  
opening  
operate,  
operated  
operation  
operator  
opposite  
optional  
or  
orange  
order,  
ordered  
organization  
orifice  
original  
oscillation  
other  
our (we)  
out  
outer  
outlet  
output  
outside  
over  
overhaul  
overload  
own

## P

package  
page  
paragraph  
parallel  
part  
particles  
passage  
past  
per  
percent  
performance  
period  
permanent,  
permanently

Fig. 14. (Continued)

permissible  
 permit,  
     permitted  
 person  
 personnel  
 phase  
 photo  
 piece  
 pitch  
 place  
 plan  
 play  
 plus  
 pneumatic,  
     pneumatically  
 pocket  
 point  
 polarity  
 position  
 positive,  
     positively  
 possible,  
     possibly  
 power  
 practical,  
     practically  
 precision  
 predictable  
 preload  
 preparation  
 present  
 pressure  
 prevent,  
     prevented  
 preventive  
 price  
 primary  
 principle  
 probable,  
     probably  
 problem  
 procedure  
 product  
 proof  
 protection  
 pull,  
     pulled  
 purchase  
 purple  
 purpose  
 push,  
     pushed  
 put

## Q

quality  
 quantity

## R

radial,  
     radially  
 radius  
 ran (run)  
 range  
 rapid,  
     rapidly  
 rate  
 rated  
 rating  
 ratio  
 read  
 ready  
 real,  
     really  
 rear  
 reason  
 rebuilt,  
     rebuildable  
 recommendation  
 reconditioning  
 record  
 red  
 reduction  
 reference  
 regular,  
     regularly  
 reinforcement  
 relation  
 release,  
     released  
 remainder  
 remember,  
     remembered  
 remote,  
     remotely  
 removal  
 remove,  
     removed  
 repair  
 replacement  
 report  
 reserve  
 reservoir  
 resistance

respective,  
     respectively  
 restriction  
 result  
 retract,  
     retracted  
 return  
 reverse  
 revision  
 revolution  
 right (R.H.)  
 rigid,  
     rigidly  
 room  
 rotation  
 rough,  
     rougher  
     roughest  
 round  
 rule  
 run (ran)

## S

safe,  
     safely  
     safer  
 safety  
 same  
 say,  
     said  
 saw  
 scale  
 schematic  
 scrape  
 scratch  
 seal,  
     sealed  
 seat  
 second  
 secondary  
 section  
 sediment  
 see  
 seen  
 seizure  
 selection  
 send,  
     sent  
 sentence

Fig. 14. (Continued)

separate,  
     separately  
 separation  
 sequence  
 series  
 service  
 set  
 setting  
 seven,  
     seventh  
 several  
 shape  
 sharp  
 sheet  
 shift  
 shiny  
 shipment  
 shock  
 shoe  
 shop  
 short,  
     shorter  
     shortest  
 shoulder  
 show,  
     showed  
     shown  
 side  
 sign  
 silent,  
     silently  
 similar,  
     similarly  
 since  
 single  
 six,  
     sixth  
 size  
 slide,  
     slid  
 slope  
 slow,  
     slower  
     slowest  
 slowly  
 small,  
     smaller  
     smallest  
 smooth,  
     smoother  
     smoothest  
 smoothly

so  
 soft,  
     softer  
     softest  
 solid,  
     solidly  
 solution  
 some  
 soon  
 sound  
 source  
 space  
 spark  
 speak  
 spoke  
 special,  
     (especially)  
 specific,  
     specifically  
 specification  
 speed  
 spiral  
 square  
 stability  
 stall  
 standard  
 start,  
     started  
 stationary  
 steering  
 step  
 still  
 stop,  
     stopped  
 storage  
 straight  
 strength  
 stress  
 stroke  
 strong,  
     strongly  
     stronger  
 student  
 subject  
 subtract  
     subtracted  
 subtraction  
 suction  
 sudden,  
     suddenly  
 supply,  
     supplies

support  
 sure  
 surface  
 suspension  
 symbol  
 system  
  
 T  
  
 take (took)  
 taught  
 teach  
 technical  
 teeth (tooth)  
 telescopic  
 tell,  
     told  
 temperature  
 temporary,  
     temporarily  
 ten,  
     tenth  
 tensile (strength)  
 tension  
 test  
 testing  
 than  
 that  
 the  
  
 then  
 there  
 these  
 they  
 thick,  
     thicker  
 thickness  
 thin,  
     thinner  
 third  
 this  
 thorough,  
     thoroughly  
 those  
 thread  
 three  
 through (thru)  
 throw,  
     thrown  
 thrust  
 tight,  
     tighter  
     tightest

Fig. 14. (Continued)

tighten	V	what
tightened		when
tilt,		where
tilted	vacuum	which
time	value	while
times	valve	white
timing	vapor	who
tip	variable	why
title	vehicle	wide,
to	vent (air)	wider
toe	vertical,	widest
together	vertically	width
tolerance	very	will
too	vibration	with
took (take)	view	without
tool	viscosity	word
tooling	visual,	work,
tooth (teeth)	visually	worked
top	voltage	world
torque	volume	worn
total	W	write,
toward		wrote
training	wall	wrong,
transport	warm,	wrongly
travel	warmer	wrote (write)
treated	warning	Y
triangle	warranty	year
troubleshooting	was	yellow
turn,	wash,	yet
turned	washed	yield
twist	water	you
twisted	way	your
two	we	Z
type	weak,	zero
typical	weaker	
U	weakest	
under	wear	
understand,	week	
understood	weight	
unit	weld,	
unless	welded	
until	welding	
up,	went	
upper	were	
usable	wet	
use,		
used		
user		

Fig. 14. (Continued)



WORD	PART OF SPEECH	DEFINITION/REFERENCE
I	pron	The first person singular
ice	n	material
identification	n	an act of determining exactly, finding the correct name or cause
idle	n	inactive, under no load, minimum rotation
if	conj	allowing that, on condition that
illustration	n	something in two-dimensional reproduction
immediate-ly	adj	instant, very soon in time, instantaneous
	adv	closely, straightway, instantly
impact	n	a striking, a forceful contact, the effect of contact with force
implement	n	utensil, the work-producing part of a machine
important	adj	marked by or possessing weight or consequence
improve,-d	vb	to make something better than before
improvement	n	something that enhances excellence, better than before
in	prep	function word for spatial or other inclusion
	adv	to or toward the inside, within
inch	n	dimension, unit of measure
including	part	embracing, involving, adding to
increase	n	an addition or enlargement, a gain
increase,-d	vb	to cause a gain, addition, enlargement
indication	n	the action of indicating, a reading
industry	n	manufacturing activity as a whole, non-vehicular application (engines)

Fig. 15. Excerpt from Dictionary--Terms Beginning with the Letter "I"

information	n	knowledge obtained, data
inhibitor (rust)	n	material (chemical)
injection	n	an act or instance of forcing fuel into a cylinder
injury	n	bodily harm, result of an accident
inlet	n	an opening for intake, entrance, port
inner	adj	situated farther in,
input	n	power or energy put into a machine or system; something put in; information fed into a computer
iron	n	material, metal
inside	adv	on the inner side, in or into the interior; internal
inspect,-ed	vb	to make an examination, looking closely
inspection	n	an examination, a close look
install,-ed	vb	to put into an indicated place, to mount, attach
installation	n	something that is put into place
instead	prep	as an alternative to, or substitute for
instruction	n	direction, a suggestive explanation
instructor	n	teacher, trainer
instrument	n	utensil, gauge, measuring device, indicator
insulation	n	a nonconductor; the act of insulating
interval	n	a time period of repetition, a repetitive dimension
into	prep	function word for entry, insertion or inclusion
introduction	n	a part of a book preliminary to the main portion, a start, an overview
is	vb	third person singular of to be
issue	n	a particular release, or publication at a date
it	pron	that one
item	n	a separate part in an enumeration
its	pron	possessive of it

Fig. 15. (Continued)

fication, vocabulary limitation and standardization of style and writing approach. To accomplish this, there are, as in any language, rules to be followed, audiences to be understood and styles to be understood and practiced. When all are combined, the result, as demonstrated by Caterpillar and several others, can be more easily understood, more technically correct documentation.

One important "offspring" of the Caterpillar effort needs special mention here, and that is NCR Fundamental English. Although based on Caterpillar's efforts, there are still several important differences.

The most apparent of these is the dictionary. The NCR dictionary definitions are, themselves, written in controlled English. This is due to a difference in intent on the part of NCR (4). From the beginning NCR intended wide dissemination, to all users of their documentation, so the use of controlled English, they believed was required. "We printed it and distributed it to anybody who wanted it [4]." Caterpillar's dictionary, on the other hand, is not intended for use by other than the technical writer and, perhaps, some instructors.

The NCR dictionary also contains alphabetical entries for "non-allowed" (or non-standard words that are not part of the basic vocabulary). The entry refers the reader to other words or phrases that are part of the

vocabulary. Finally, of course, the vocabulary is tailored to their business needs, computers vs. the machinery needs of Caterpillar. A sample of the contents is contained in Figure 16.

Though NCR is not as rigid in syntax and grammar rules as Caterpillar, they still strive for basic simplicity and lack of redundancy.

NCR also stated they had not experienced the 15-20% increase in documentation size predicted by Caterpillar. The basic reason was attributed to the approach of implementing controlled English techniques. Specifically, writers are encouraged to "rethink" a document and challenge the very need for some of its parts rather than to just convert it into controlled English. Thus, according to NCR, they did not experience a net gain of 20% in size of documents as, while they were converting to controlled English, they were also "throwing out a lot of phrases and clauses that were really not necessary [4]," thus compensating for any growth due to rephrasing.

Together, the NCR and Caterpillar efforts illustrate very well the ability to develop a tailored application of controlled English to suit almost any application.

initializes the disk pack before using it. While the routine is initializing the disk pack, the operator can do other things. The operator initialized the disk pack before using it.)

noun: the process of putting a thing in the proper state or condition to be used (Example: The character positions are reserved during initialization.)

adjective: relating to a thing that has been put in the proper state or condition to be used (Example: The initialized disk pack is ready for use.)

*initially* (consider using: when starting)

**initials** (n)

the first letter of each name of a person (Examples: The initials of David M. Taylor are DMT. Put your initials on the modification record card.)

*initiate* (consider using: start or perform)

*in-line* (consider using: in sequence)

*inner* (consider using: space within or surface within)

*inoperative* (consider using: not operating or does not operate)

**input** (v, n, adj), **inputs** (v), **inputting** (v), **input** (v)

verb: to send a signal or data to an internal, or central, location (Examples: The circuits input a signal every second. The circuit inputs a signal every second. While the terminal is inputting data, the program processes the previous block. When the software input the first block of data, the program started to process it immediately.)

noun: data or signals that are input (Examples: The input is copied from disk or punched cards. The input to the AND gate is checked by the diagnostic routine.)

adjective: relating to the action of sending a signal or data to an internal, or central, location (Example: The input signals are sent every second.)

*inquire* (consider using: make an inquiry)

**inquiry** (n, adj)

noun: a request for information (Example: The subroutine processes all inquiries.)

adjective: relating to a request for information (Example: The inquiry program operates in the foreground.)

**insert** (v), **inserts** (v), **inserting** (v), **inserted** (v, adj), **insertion** (n)

verb: to put a thing into another thing at a specific point or location (Examples: The routine can insert the record into the file. The routine inserts the record into the file. The routine is inserting the record into the file. The record is inserted at the proper position in the file.)

noun: the action of inserting (Example: The insertion was made properly.)

adjective: relating to a thing that was put into another thing at a specific point or location (Example: The inserted record is available to the program.)

Fig. 16. Sample from NCR Dictionary

**inside (adj, prep)**

relating to being within the limits or internal surfaces of a thing (Examples: The inside dimensions are given in the following table. [adjective] Acoustic material is packed inside the panels. [preposition])

*inspect (consider using: check, test, or look at)*

*inspection (consider using: consideration or check)*

**install (v), installs (v), installing (v), installed (v, adj), installation (n, adj)**

verb: to set in position and make the necessary preparations for use (Examples: Field engineers install the systems. The field engineer installs the system. The field engineer is installing two systems. Five systems have been installed.)

noun: a thing that has been installed and is in use, or the procedure of installing a thing (Examples: This installation was used as a test site. The installation of the system has been completed.)

adjective: relating to the action of setting a thing in position and making the necessary preparations for use (Examples: The installed system is ready for testing. The installation date is two weeks from now.)

*instance (consider using: example, for, for this use, if, or when)*

*instantaneous (consider using: immediate)*

**instead (adv)**

as an alternative or replacement (Examples: Under specific conditions, the routine can be called from the alternate system disk instead of the current system disk. If the first terminal is in use, the second one may be used instead.)

*institution (consider using: organization, company, store, hospital, restaurant, school, bar, or bank)*

*instruct (consider using: give instructions, train, or inform)*

**instruction (n)**

(1) a unique set of characters that specifies one operation, together with the values or locations of all necessary operands, and causes the computer to perform the operation (Example: The complete routine has only seven instructions.) (2) an explanation of a procedure and how it is to be performed (Example: Instructions are displayed to the operator.) (3) the action of giving an explanation of a thing, concept, or procedure (Example: A new course of instruction on programming has been written.)

Fig. 16. (Continued)

APPENDIX C  
DOCUMENT VERSIONS



FMS Customer Guide--Narrative Version

3-5 FOLLOWUP, MODIFICATION AND CANCELLATION PROCEDURES.

a. The following types of forms and formats are authorized for use when the customer country is preparing MILSTRIP followups, requisition modifiers and cancellation requests.

(1) Mechanical Preparation. DD Form 134m, DoD Single Line Item Requisition System Document (Mechanical). This keypunched card will be used by FMS countries having AUTODIN transmission capability. Mail may be used if such capability does not exist.

(2) Manual preparation.

(a) DD Form 1348, DoD Single Line Item Requisition System Document (Manual).

(b) DD Form 173, Joint Message Form.

(c) Letter Format the same as a Joint Message Form.

b. A Document Identifier Code (DIC) is a three character (alpha/numeric) identification of a document conforming to the MILSTRIP standard format. The following are authorized for use for the purpose indicated:

(1) Requisition followup requests bearing document identifier AF2 are used in requesting the latest status of a requisition.

(2) Requisition followup requests bearing document identifiers AT1, AT4 or AT5, as applicable, are used in requesting the latest status of a requisition if the International Logistics Control Office (ILCO) has not provided an acknowledgement card for the original requisition. The third position of the document identifier will be perpetuated from the third position of the document identifier on the original requisition. AT5 followups must contain exception data from the original requisition and must be forwarded by means other than AUTODIN.

(3) Requisition followup requests bearing document identifier AFC are used to request improvement of an estimated shipment date when the estimated shipment date provided in previous supply status is not considered satisfactory.



(4) Requisition Modifiers bearing Document Identifiers AM1, AM4, AM5 (the third position of the document identifier corresponds to the third position of the original requisitions; e.g., an AM5 document modifier is used to change an AØ5 requisition) are used to modify one or more of the following fields:

(a) Priority Designator Code (CC 60-61). The entry in the Priority Designator field is based on the customer's Force Activity Designator and urgency of need. The Priority Designators can be raised or lowered through the use of requisition modifiers.

(b) Required Availability Date (CC 62-64). The entry in the Required Availability Date field indicates when the customer requires the material. This date can be advanced or delayed through the use of requisition modifiers. If the ILCO has no record of the requisition, the AM\_ will be processed as a new requisition.

(5) Cancellation requests bearing document identifier AC2 are used when cancellation of a partial or total quantity on a requisition previously submitted is desired.

(6) Followup on cancellation requests bearing document identifier AK2 are used when no acknowledgement has been received to a previously submitted cancellation request. If the ILCO has no record of the cancellation request, the AK2 will be processed as a request for cancellation.

(7) Requests for supply assistance may be initiated on previously submitted priority Ø1-Ø8 requisitions when nonreceipt of requested material by the required date will result in emergency conditions in-country. A request for assistance may be submitted by message, letter or telephone utilizing format shown in Figure 3-27. The justification for the request for supply assistance must be furnished.

#### c. Followup Submission Criteria

(1) AF2 followups may be submitted based on the following time frames:

(a) If no status has been received acknowledging receipt of the requisition, followups may be submitted after five days from the requisition submission date for priority Ø1-Ø8 and after 15 days from the requisition submission date for priority Ø9-15. (For requisitions transmitted by mail, add the additional mailing time.)

(b) Once supply status (DIC AE2) has been received, followup may be submitted only after expiration of the ESD (Estimated Shipping Date) plus five days for priority Ø1-Ø8 requisitions and after 15 days for priority Ø9-15 requisitions. However, if BL status was received with a Notice of Availability transmission date in CC 70-73, followups must be initiated to the freight forwarder prior to submission of the followup to U.S. Service. (For documents transmitted by mail, add the additional mailing time.)

(c) If contract status (DIC AB2) has been received, followup may be submitted only after expiration of the ESD plus 60 days. (For documents transmitted by mail, add the additional mailing times.)

(d) If the latest status received provided no ESD, followup may be submitted when:

1. Twenty days have elapsed since the status card receipt date for priority Ø1-Ø8. (For documents transmitted by mail, add the additional mailing time.)

2. Thirty-five days have elapsed since the status card receipt date for priority Ø9-15. (for documents transmitted by mail, add the additional mailing time.)

(2) AT\_ followups may be submitted when no response is received to an AF2 followup and a valid requirement still exists. The AT\_ followup should be used only after careful manual research to preclude duplicating requirements.

(3) AFC requests for improved ESD may be submitted only for priority Ø1-Ø8 requisitions after receipt of supply status for which the latest ESD is beyond the material need or usage date. AFC may not be submitted after receipt of shipment status.

(4) AM\_ requisition modifiers (may not be submitted after receipt of BA or BV status).

(a) A requisition modifier document may be initiated by the requisitioner or ILCO to modify previously submitted requisitions when:

1. Force/Activity Designators (FAD) are upgraded or downgraded upon implementation of contingency plans or for other reasons.

2. Required dates for previously requisitioned material change due to unplanned or unforeseen emergencies. Such emergencies include declared national emergencies and local emergencies which created a lack of material required for:

a. Performance of assigned operational missions or tasks.

b. Emergency repairs to primary weapons and equipment.

c. Prevention or work stoppage at industrial/production activities engaged in repair, modification, or manufacture of primary weapons, equipment, and supplies.

(b) A requisition modifier document may be initiated by the requisitioner or ILCO when the priority of an item previously requisitioned is modified. When the quantity required is greater than the quantity previously requisitioned, a requisition modifier will be submitted for the original quantity and a new requisition will be submitted for the additional quantity required under the new priority. If the quantity required is less than the quantity required under the new priority and if the quantity in the original requisition will be excess to needs, a cancellation request for this requisition should be submitted.

(c) A requisition modifier document may be initiated by the requisitioner or ILCO when a change is required to the Priority Designator Code and/or Required Delivery Date.

(5) AK2 Followup cancellation requests may be submitted after 15 days if no status is received confirming or acknowledging receipt of the cancellation request. If status is still not received, a second followup may be submitted after an additional 10 days. Once cancellation related (e.g., B9) status is received, followups may be submitted only after 35 days have elapsed from the status receipt date.

(6) Followups may not be submitted after receipt of shipment status (DIC AS2 or AU2).

d. Followup Submission Criteria Matrix. For ready reference, a followup table is provided based on the paragraph 3-5c narrative criteria for followup:

<u>Type Followup</u>	<u>Priority Designator</u>	<u>Conditions</u>	<u>Followup Authorized After</u>
AF2	Ø1-Ø8	No status received.	5 days from requisition submission date.
AF2	Ø9-15	No status received.	15 days from requisition submission date. For requisitions transmitted by mail, add additional mailing time.
AF2	Ø1-Ø8	Supply status received with ESD.	Expiration of ESD plus 5 days.
AF2	Ø9-15	Supply status received with ESD.	Expiration of ESD plus 15 days.
AF2	Ø1-15	Contract status.	Expiration of ESD plus 60 days.
AF2	Ø1-Ø8	Supply or Contract status received w/o ESD.	20 days after receipt of status.
AF2	Ø9-15	Supply or Contract status received w/o ESD.	35 days after receipt of status.
AT_	Ø1-15	Response to AF2 not received w within 10 days and item still required.	Research to preclude duplication of requirements.
AFC	Ø1-Ø8	Receipt of status with ESD.	ESD is beyond material need or usage date.
AM_	Ø1-15	Require change to priority and/or required availability date.	(1) FAD is upgraded or downgraded, or (2) material changes due to emergency.

<u>Type Followup</u>	<u>Priority Designator</u>	<u>Conditions</u>	<u>Followup Authorized After</u>
AK2	Ø1-15	No cancellation related status received.	After 15 days from AC2 or previous AK2 transmission date.
AK2	Ø1-15	Cancellation related status received (e.g. Status Code B9).	35 days after receipt of status.



3.5 FOLLOW-UP, MODIFICATION AND CANCELLATION PROCEDURES

- a. When a MILSTRIP requisition follow-up, MILSTRIP requisition change, or MILSTRIP requisition cancellation request is needed, use only the forms on the list below:
  - (1) DD Form 1348m, DoD Single Line Item Requisition System Document (Mechanical). This is a keypunch card. If your country can send requisitions by AUTODIN this is the form you must use. If you do not have AUTODIN the card(s) can be mailed.
  - (2) DD Form 1348, DoD Single Line Item Requisition System Document (Manual).
  - (3) DD Form 173, Joint Message Form.
  - (4) A letter with the information in the same sequence as it is on the DD Form 173.
- b. A MILSTRIP Document Identifier Code (DIC) is a group of 2 letters and 1 number. The codes on the list below can be used in this procedure.
  - (1) Code AF2 is used on a MILSTRIP requisition follow-up when you need the latest information on the original requisition.
  - (2) Codes AT1, AT4 or AT5 are used on a MILSTRIP requisition follow-up when the International Logistics Control Office (ILCO) has not sent a card that tells you he/she got the original requisition. The number 1, 4 or 5 at the end of the code is the same as the number at the end of the document identifier code of the original requisition you already sent.  
When you use code AT5 be sure the exception information from the original requisition you already sent is the same on the follow-up. Do not send follow-up with the AT5 code by AUTODIN.
  - (3) Code AFC is used when you must change the estimated shipment date to an earlier date. This is when the estimated shipment date told to you by the ILCO is not early enough.
  - (4) Codes AM1, AM4 and AM5 are used when you want to change 1 of the 2 items below:
    - (a) Priority Designator Code (in columns 60-61). This can be made higher or lower by a MILSTRIP Requisition Change. The Priority Designator Code comes from your Force Activity Designator Code (FAD) and urgency of need.
    - (b) Required Availability Date (in columns 62-64). The Original Requisition date can be

made earlier or later by a MILSTRIP Requisition Change. It tells when you need the material you have ordered.

NOTE 1: When the ILCO gets a MILSTRIP Requisition Change and does not have a record of your first requisition he/she will use it as a new requisition.

NOTE 2: The number 1, 4 or 5 that is the end of the Document Identifier Code (AM1, AM2, AM5) is the same as the number at the end of the document identifier of the requisition you have to change.

(5) Code AC2 is used when you tell the ILCO the quantity on the original requisition to be cancelled. This can be all or part of the original quantity.

(6) Code AK2 is used if you have already sent a Code AC2 Cancellation Request and the ILCO has not sent a reply telling you he/she got it.

NOTE: If the ILCO does not have a record of your first AC2 Cancellation Request he/she will use it as a new cancellation.

(7) You can send a Request for Supply Assistance only when the original requisition was priorities Ø1 to Ø8 and only when it will cause an emergency if you do not get the material. You can send a Request for Supply Assistance by message (DD Form 173), by telephone or by letter. You must tell the ILCO the reason for the request (justification) with the request.

c. Rules for sending Follow-ups:

(1) Send Code AF2 Follow-up:

(a) If the ILCO has not sent status:

1. for an original requisition with priorities Ø1 to Ø8 five days after sending it to the ILCO (add time if requisition was sent by mail)

2. for an original requisition with priorities Ø9 to 15 fifteen days after sending it to the ILCO (add time if requisition was sent by mail).

(b) If you have been sent Supply Status (DIC AE2) and

1. Estimated Shipping Date (ESD) plus 5 days is past and original requisition was priority Ø1 to Ø8.

2. Estimated Shipping Date (ESD) plus 15 days is past and original requisition was priority Ø9 to 15.

NOTE 1: Add time if original requisition was sent by mail.



NOTE 2: If you have been sent status "BL" with Notice of Availability transmission date in columns 70-73, send follow-up to your freight forwarder first.

(c) If you have been sent contract status (DIC AB2) you may send a follow-up only after the ESD plus 60 days is past. Add time if original requisition was sent by mail.

(d) If you have been sent a status but it did not have an ESD, you can submit a follow-up

1. 20 days after you get the status card and the original requisition was priority 01-08.

2. 35 days after you get the status card and the original requisition was priority 09-15.

(2) Send AT\_ follow-up when you have already sent an AF2 follow-up and the ILCO did not send any status back to you. Be sure the ILCO did not send any status before you use this code. Also be sure your Air Force still needs the material.

(3) Use the AFC code only

(a) When the original requisition was priority 01-08 and

(b) You have been sent a supply status and the ESD is too late and

(c) Shipment status has not been sent to you.

(4) Use AM\_ codes when

(a) BA or BV status has not been sent to you.

(b) Your Force Activity Designator (FAD) has changed.

(c) The original Required Delivery or Availability Date is changed by an emergency and the material is needed.

1. To do the assigned operational mission or jobs.

2. To make an emergency repair to primary weapons and equipment.

3. So work will not stop at places that do repair work, modification work or make primary weapons, equipment and supplies.

(d) When the priority of the item or the original requisition is changed. When the quantity must also be changed.

1. If the quantity is more than the original quantity, use the Requisition Modifier for the original quantity only. Send in a new requisition, with the new priority, for the remainder.

2. If the quantity you now want is less than the original quantity, send in a cancellation for the original requisition and send in a new requisition, with the new priority and the new quantity.

(e) When you have to change the Priority Designator Code and/or the Required Delivery Date.

(5) Send AK2 code follow-up if you have already sent in an AC2 code cancellation, 15 days have past and the ILCO has not sent you a status card. If status still not sent after 10 more days you can send a second follow-up.

NOTE: If B9 status has been sent to you, you can only send a follow-up after 35 days have past from the day you got it.

(6) You can not send a follow-up if you get a shipment status (DIC AS2 or AU2).

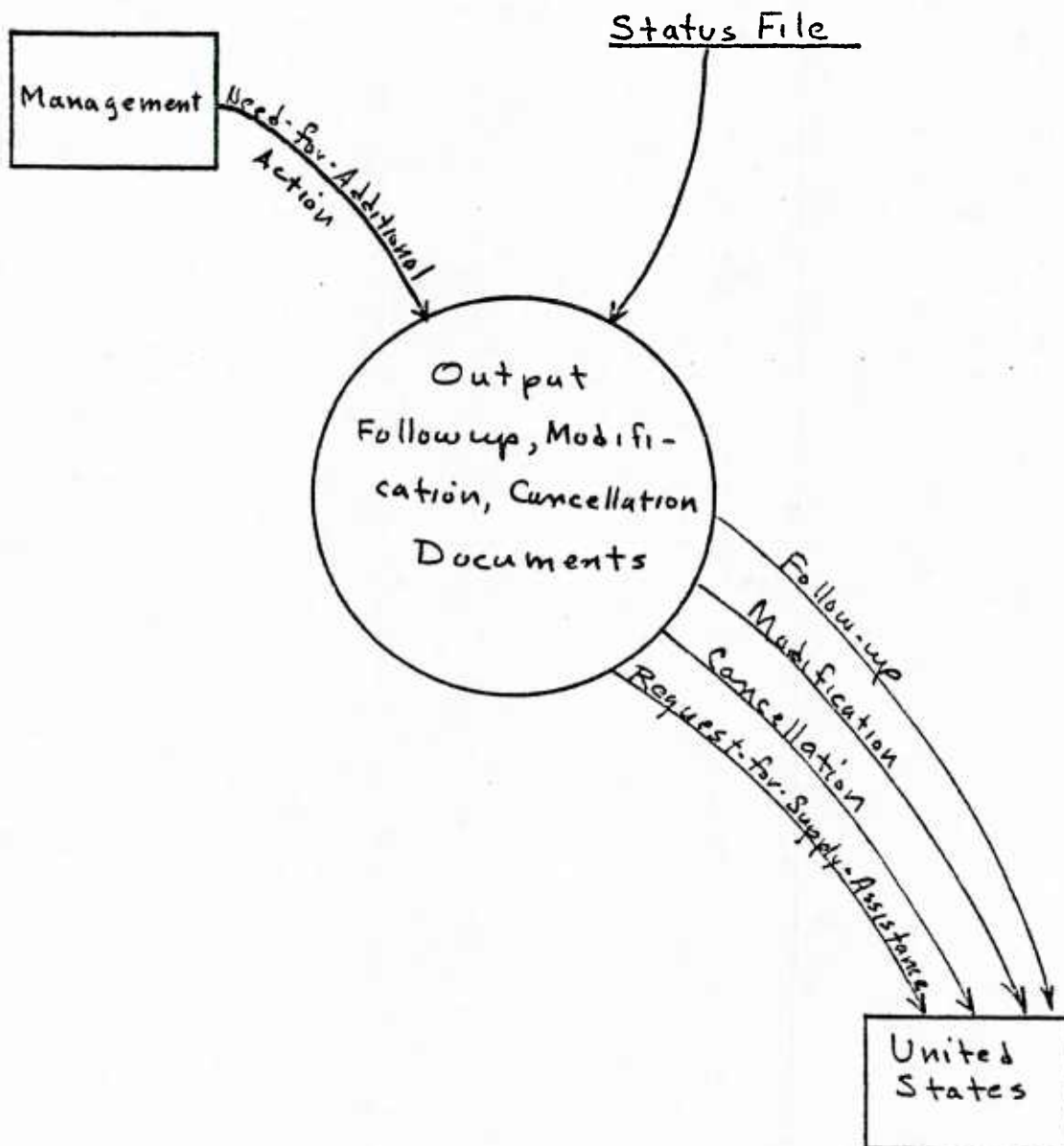
d. Follow-up Action Guide:

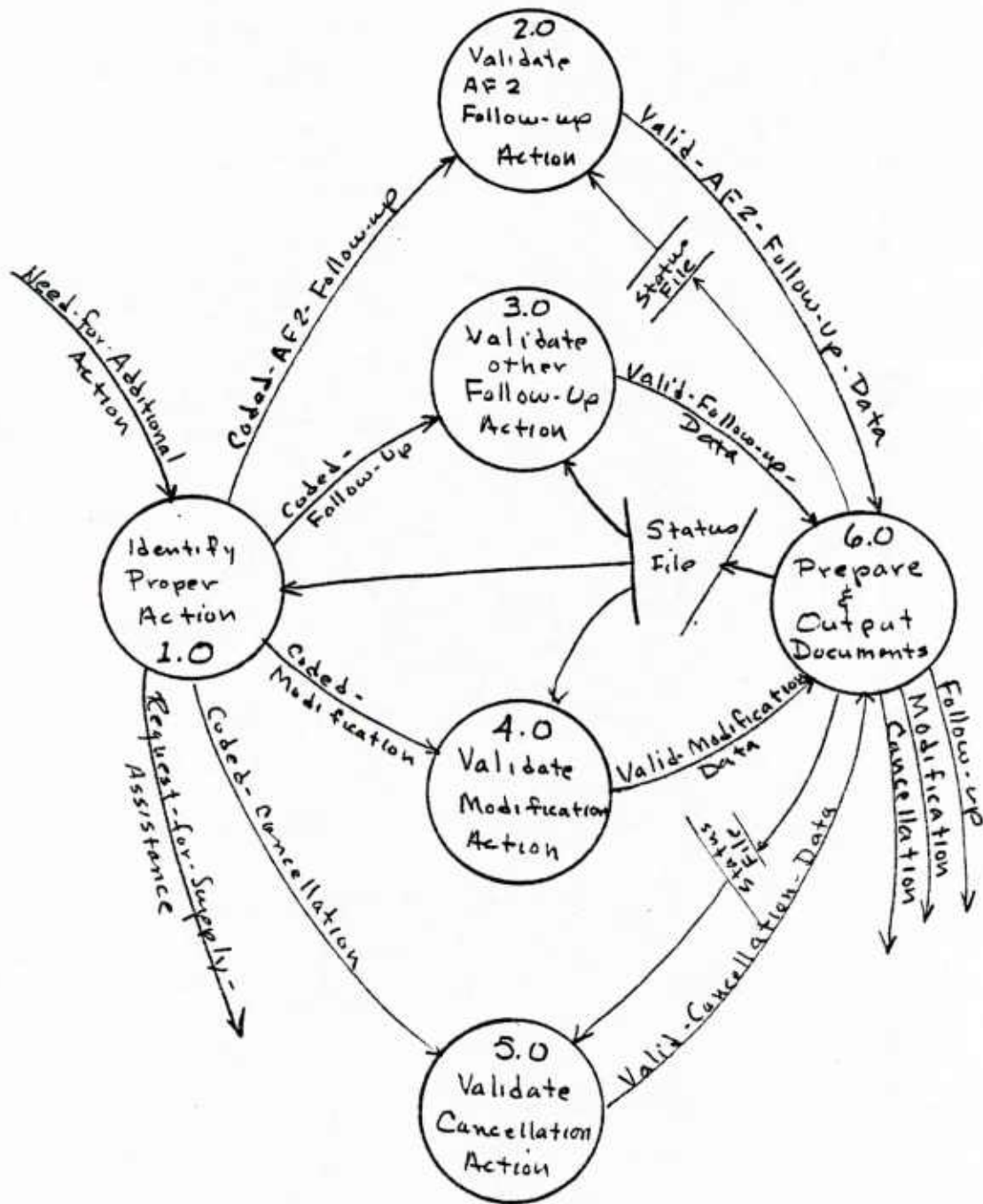
For assistance, the guide below comes from information in paragraph 3-5c, above.

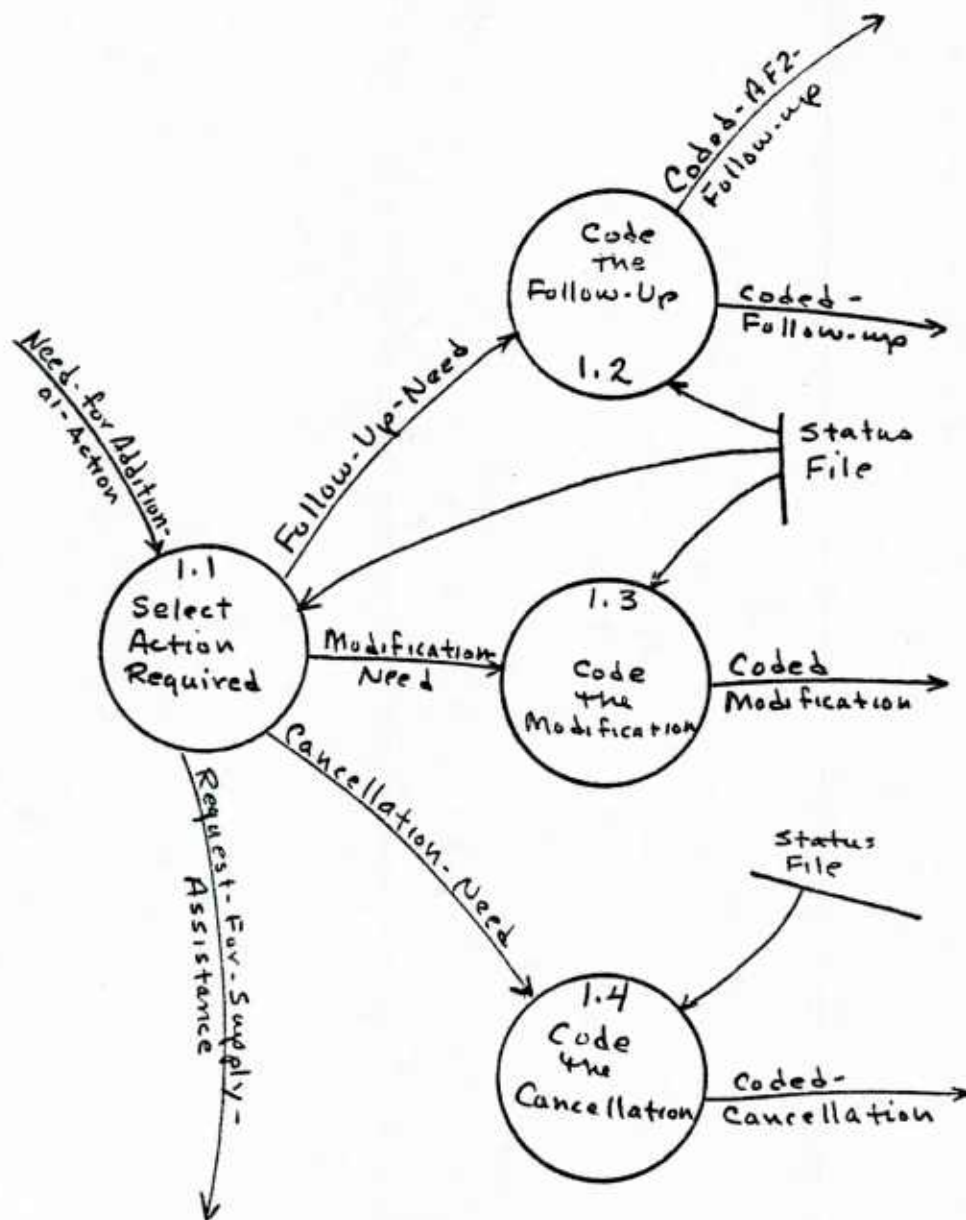
<u>Type Follow-up</u>	<u>Priority Designator</u>	<u>Conditions</u>	<u>Follow-up After</u>
AF2	Ø1-Ø8	Status has not been sent.	5 days after requisition sent.
AF2	Ø9-15	Status has not been sent.	15 days after requisition sent (if sent by mail, add more time).
AF2	Ø1-Ø8	Status sent with ESD.	5 days after ESD is past.
AF2	Ø9-15	Status sent with ESD.	15 days after ESD is past.
AF2	Ø1-15	Contract Status sent.	60 days after ESD is past.
AF2	Ø1-Ø8	Supply or Contract status sent without ESD.	20 days after you get status.
AF2	Ø9-15	Supply or Contract status sent without ESD.	35 days after you get status.

<u>Type</u> <u>Follow-up</u>	<u>Priority</u> <u>Designator</u>	<u>Conditions</u>	<u>Follow-up</u> <u>After</u>
AT_	Ø1-15	AF2 sent to ILCO and ILCO has not sent status.	1. 10 days after send sending AF2 follow-up and 2. Item still needed. 3. Check made to be sure ILCO did not send status.
AFC	Ø1-Ø8	Status sent with ESD.	Need material earlier.
AM_	Ø1-15	Need to change Priority and/or Required Availability Date.	1. FAD has been changed. 2. Emergency.
AK2	Ø1-15	No cancellation status sent.	15 days after AC2 cancellation sent or last AK2 sent.
AK2	Ø1-15	Cancellation status sent (Code B9).	35 days after you get status.

FMS Customer Guide--Structured Version









- 1.1 For each Need-For-Additional-Action received
- If a need for Supply Assistance Exists (original or modified requisition was a priority Ø1 through Ø8 (obtain Requisition Information from Status-File) and non-receipt of requisitioned material will result in emergency conditions in-country).
    - Determine urgency of reply time required.
    - If immediate (same day), output Request-For-Supply-Assistance by telephone.
    - Or if priority (within one week), output Request-For-Supply-Assistance by Message (ref. Figure 1 for format).
    - Else, (routine (over one week allowed)), output Request-For-Supply-Assistance by letter (use same format as for Message).
    - Else, by Precoded Problem Identifier or Narrative Problem Statement, determine type of action required.
      - If Follow-up, obtain date of last action from the Status-File, confirm Requisition Number and output Follow-Up-Need.
      - Or if Modification, confirm the Requisition Number in the Status-File, obtain the Modification-Required from the Narrative Problem Statement and output Modification-Need.
      - Else, (Cancellation), confirm the Requisition Number in the Status-File, obtain the quantity to be cancelled (Full Requisition Quantity or Partial Requisition Quantity) from the Narrative Problem Statement and output Cancellation-Need.

- 1.2 For each Follow-Up-Need received  
Obtain Requisition Information from the Status-  
File.  
If a Cancellation has been sent to the U.S.,  
output Coded-Follow-Up with code AK2.  
Or if a status with ESD has been received but ESD  
is beyond material need or usage date, output  
Coded-Follow-Up with code AFC.  
Or if a Follow-Up with code AF2 has been sent to  
the U.S., the item is still required and no  
response received within 10 days of sending  
the AF2 Follow-Up, output Coded-Follow-Up  
with code AT1 or AT4 or AT5 (the last number  
shall correspond to the third position of the  
document identifier of the original requisition).  
Else, output a Coded-AF2-Follow-Up.



- 1.3 For each Modification-Need received  
Confirm Requisition Number with date in the  
Status-File  
Output coded Modification with code AM1 or AM4  
or AM5 (the last number shall correspond to  
the third position of the document identifier  
of the original requisition).

- 1.4 For each Cancellation-Need received  
Confirm Requisition Number with data in the Status-  
File  
Output Coded-Cancellation.

- 1.3 For each Modification-Need received  
Confirm Requisition Number with date in the  
Status-File  
Output coded Modification with code AM1 or AM4  
or AM5 (the last number shall correspond to  
the third position of the document identifier  
of the original requisition).

1.4 For each Cancellation-Need received  
Confirm Requisition Number with data in the Status-  
File  
Output Coded-Cancellation.

- 2.0 For each Coded-AF2-Follow-Up received  
 Compare received information with data in the  
 Status-File for that Requisition Number.  
 Take the action indicated in the following table/  
 rules.

Condition (Defined Below)	Rules													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Status	R	R	R	R	N	N	N	N	R	R	R	R	R	R
ESD	R	R	R	R	N	N	N	N	N	N	R	R	N	N
Priority	1	1	2	2	1	1	2	2	1	1	3	3	2	2
Source	N	N	N	N	N	N	N	N	A	A	C	C	A	A
Time	3	9	4	1	1	7	2	8	6	12	5	10	13	14
Action	2	3	2	3	1	3	2	3	2	3	2	3	1	3

CONDITION DEFINITIONS:

Status: Received = R  
 Not received = N  
 Estimated Shipping Date:  
 (ESD) Received = R  
 Not received = N  
 Priority: 01-08 = 1  
 08-15 = 2  
 Any = 3  
 Supply Source: Contact = C  
 Non contact = N  
 Any = A

ACTIONS:

1. Output Valid-AF2-Follow-Up-Data with Original Requisition Data.
2. Output Valid-AF2-Follow-Up-Data with Most Recent Status Document Data.
3. Reject to originator with note that follow-up time not yet reached.

TIME CONDITIONS: (Add 5 days if Original Requisition submitted by mail.)

5	days since Original Requisition	=	1
5	" "	=	7
15	" "	=	2
15	" "	=	8
5	" past ESD	=	3
5	" "	=	9
15	" "	=	4
15	" "	=	10
60	" "	=	5
60	" "	=	11
20	" since last status without ESD	=	6
20	" " " "	=	12
35	" " " "	=	13
35	" " " "	=	14

3.0 For each Coded-Follow-Up received that is coded AT1, AT2 or AT3  
 Compare received information with data in the Status-File for that Requisition Number.  
 If Status-File indicates AF2 Follow-Up has been issued  
   If AF2 Follow-Up issued over 10 days ago and no response received/recorded  
     Output Valid-Follow-Up-Data with AT1, AT2, AT3 Document Identifier, as received, and with Most Recent Status Document Data in columns 7-80.  
   Else, reject to originator with note that Follow-Up time not yet reached.  
 Else, reject to prior process as miscoded. Note that AF2 has not yet been issued.  
 For Follow-Up coded AFC  
   Compare received information with data in the Status-File for that Requisition Number.  
   If original requisition was priority Ø1-Ø8, supply status has been received and latest ESD is past the material need or use date, and Shipment Status has not been received, output Valid-Follow-Up-Data with AFC Document Identifier and Most Recent Status Document Data in columns 7-80.  
   Else, (Shipment Status received) reject to originator noting that shipping status has been received.  
 For Follow-Up coded AK2  
   Compare received information with data in the Status-File for that Requisition Number.  
   If 15 or more days have passed since the cancellation was submitted and no status has been received,  
     Output Valid-Follow-Up-Data with AK2 Document Identifier and Original Requisition Data.  
   Else,  
     If cancellation status has been received but no shipping status and  
       If 35 days have passed since status was received, Output-Valid-Follow-Up-Data with AK2 Document Identifier and Most Recent Status Document Data.  
       Else, reject to originator noting time requirement Follow-Up not met.  
     Else, reject to originator noting time requirement for Follow-Up not met or that shipping status was received.

4.0 For each Coded-Modification received  
 Compare received information with data in the  
 Status-File for that Requisition number.  
 If status has been received and status was not  
 BA or BV and Shipment Status has not been  
 received and  
 If Changed Requisition Priority is required  
 Output Valid-Modification-Data with  
 Document Identifier AM1, AM2, or AM5,  
 as received, Most Recent Status Document  
 Data, and Modified (New) Priority  
 Designator Code.  
 Else,  
 If Changed Required Delivery Date is  
 required  
 Output Valid-Modification-Data with  
 Document Data and Modified (New)  
 Required Delivery Date.  
 Else, (Both priority and date to be  
 changed)  
 Output Valid-Modification-Data with  
 Document Identifier AM1, AM2, or  
 AM5, as received, Most Recent Status  
 Document Data and Modified (New)  
 Priority Designator Code and Modified  
 (New) Required Delivery Date.  
 Else,  
 If status has not been received, proceed as  
 above except use Original Requisition  
 Data in place of Most Recent Status  
 Document Data.  
 Else, (Status BA or BV or Shipping Status  
 (codes DIC AS2 or AU2) received), reject  
 to originator noting which of the above  
 status codes has been received and the  
 date it was received.

5.0 For each Coded-Cancellation received  
    Compare received information with data in the  
        Status-File for that Requisition Number.  
    If Shipping Status Coded DIC AS2 or AU2 have not  
        been received and  
        If no supply status has been received  
            Output Valid-Cancellation-Data with AC2  
                Document Identifier plus Original  
                Requisition Data.  
    Else, (Supply status received)  
        Output Valid-Cancellation-Data with AC2  
            Document Identifier plus Most Recent  
            Status Document Data.  
    Else, reject to originator noting that shipping  
        status already received and the date it was  
        received.



6.0 For each Valid-Cancellation-Data received  
     If AUTODIN capability exists  
         Output Cancellation on DD Form 1348m,  
     Else,  
         Output Cancellation on DD Form 173.  
 For each Valid-Modification-Data received  
     If AUTODIN capability exists  
         Output Modification on DD Form 1348m,  
     Else,  
         If priority 01-08  
             Output Modification on DD Form 173  
         Else,  
             Output Modification, by mail, on DD Form  
                 1348 (if available) or on Letter Format.  
 For each Valid-Follow-Up-Data or Valid-AF2-Follow-Up-  
     Data received  
     If AUTODIN capability exists  
         Output Follow-Up on DD Form 1348m.  
     Else,  
         Output Follow-Up by mail, on DD Form 1348 (if  
             available) or Letter Format.  
 In all cases above  
     Update Status-File with action taken.

## DICTIONARY

### Cancellation

Proper Form plus  
Valid Cancellation Data

### Cancellation-Need

Requisition Number plus  
Full Requisition Quantity or  
Partial requisition quantity

### Coded-AF2-Follow-Up

Follow up Need plus  
AF2 Code

### Coded-Cancellation

Cancellation Need plus  
AC2 Code

### Coded-Follow-Up

Follow up Need plus  
AT 1 code or  
AT 4 code or  
AT 5 code or  
AFC code or  
AK 2 code

### Coded-Modification

Modification Need plus  
AM 1 code or  
AM 4 code or  
AM 5 code

### Follow-Up

Proper Form plus  
Valid Follow-up Data

### Follow-up-Need

Need for Additional Action plus  
Date of last action

## DICTIONARY CONTINUED

### Modification

Proper Form plus  
Valid Modification Data

### Modification-Need

Requisition Number plus  
Modification-Required

### Modification-Required

Either a Changed Requisition Priority or  
Changed Required Delivery Date

### Need-for-Additional-Action

Requisition Number plus  
Narrative Problem Statement and  
(optional) Pre-Coded Problem Identifier

### Proper-Form

DD Form 1348m or  
DD Form 1348 or  
DD Form 173 or  
Letter Format (Formulated as DD Form 173)

### Request-for-Supply-Assistance

Requisition Number (Document Numbers Involved) plus  
NSN or  
P/N plus  
Case Identifier plus  
Justification for request

### Status-File

Requisition Number plus  
Status Reports/Requisition Information (History Data  
on an identified Requisition, all actions taken  
since original submittal.)

### Valid-AF 2-Follow-Up-Data

AF 2 Document Identifier plus  
Routing Identifier from original Requisition, columns  
4-6 plus  
Either Most Recent Status Document Data in columns 7-80  
or Original Requisition Date in columns 7-80

## DICTIONARY CONTINUED

### Valid-Cancellation-Data

Document Identifier plus  
Routing Identifier Code from Original Requisition,  
columns 4-6 plus  
Either Original Requisition Data, columns 7-24 or  
Most Recent Status Document Data, columns 7-24 plus  
Quantity to be cancelled plus  
Either Original Requisition Data, columns 30-80 or  
Most Recent Status Document Data, columns 30-80

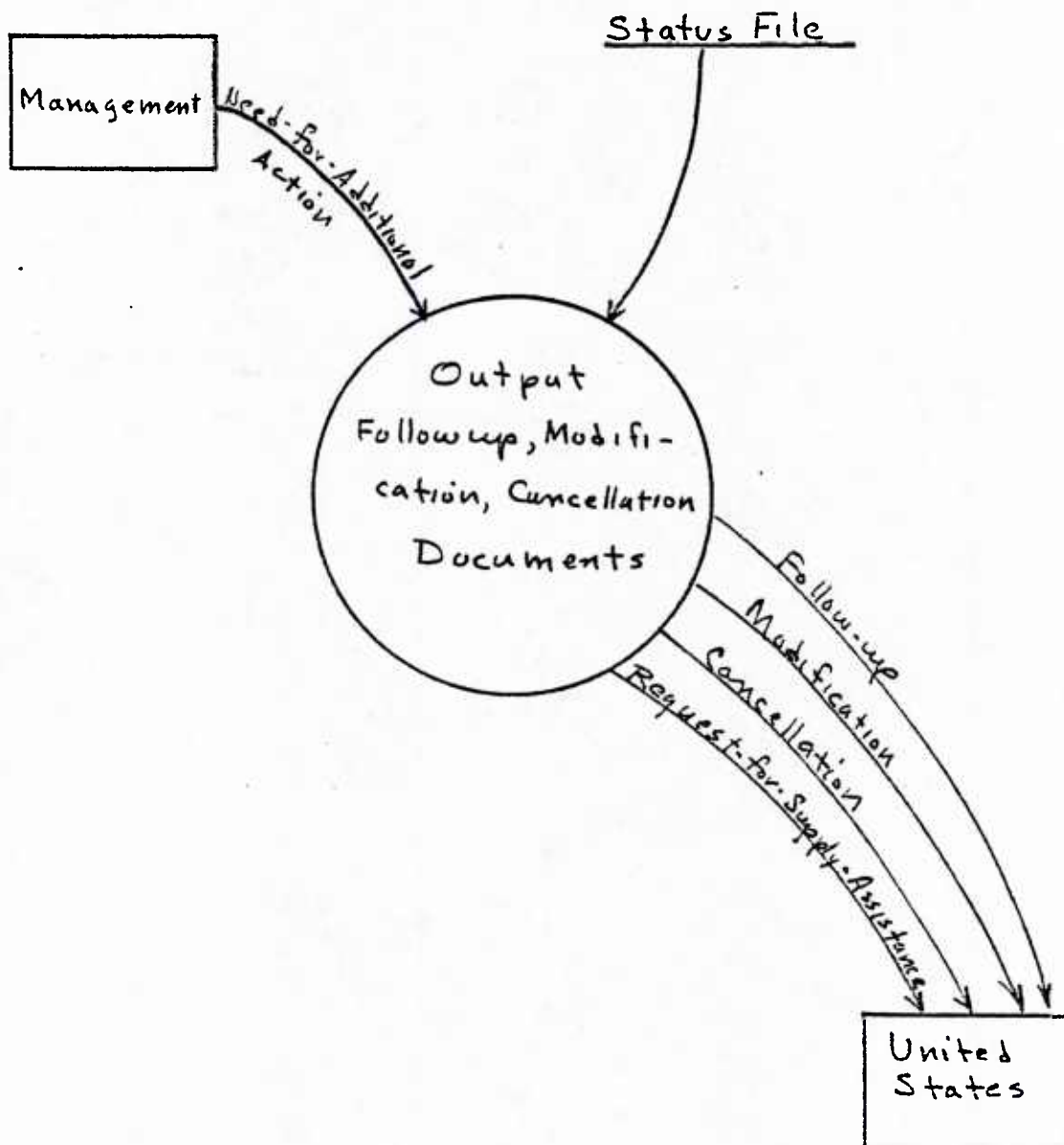
### Valid-Follow-up-Data

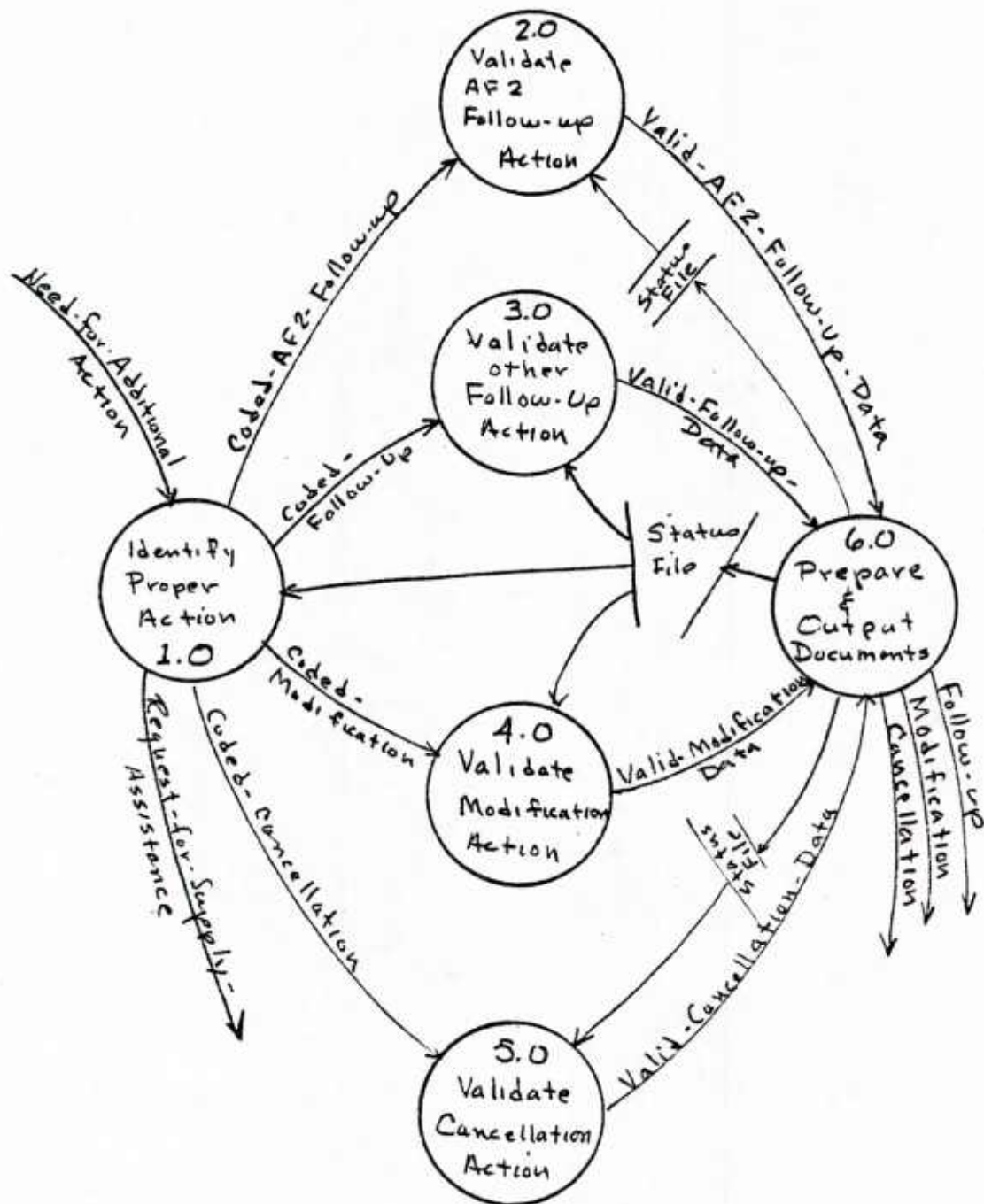
Document Identifier, in columns 1-3 plus  
Routing Identifier from Original Requisition columns 4-6  
plus  
Either Most Recent Status Document Data, in columns  
7-80 or  
Original Requisition Data, columns 7-80

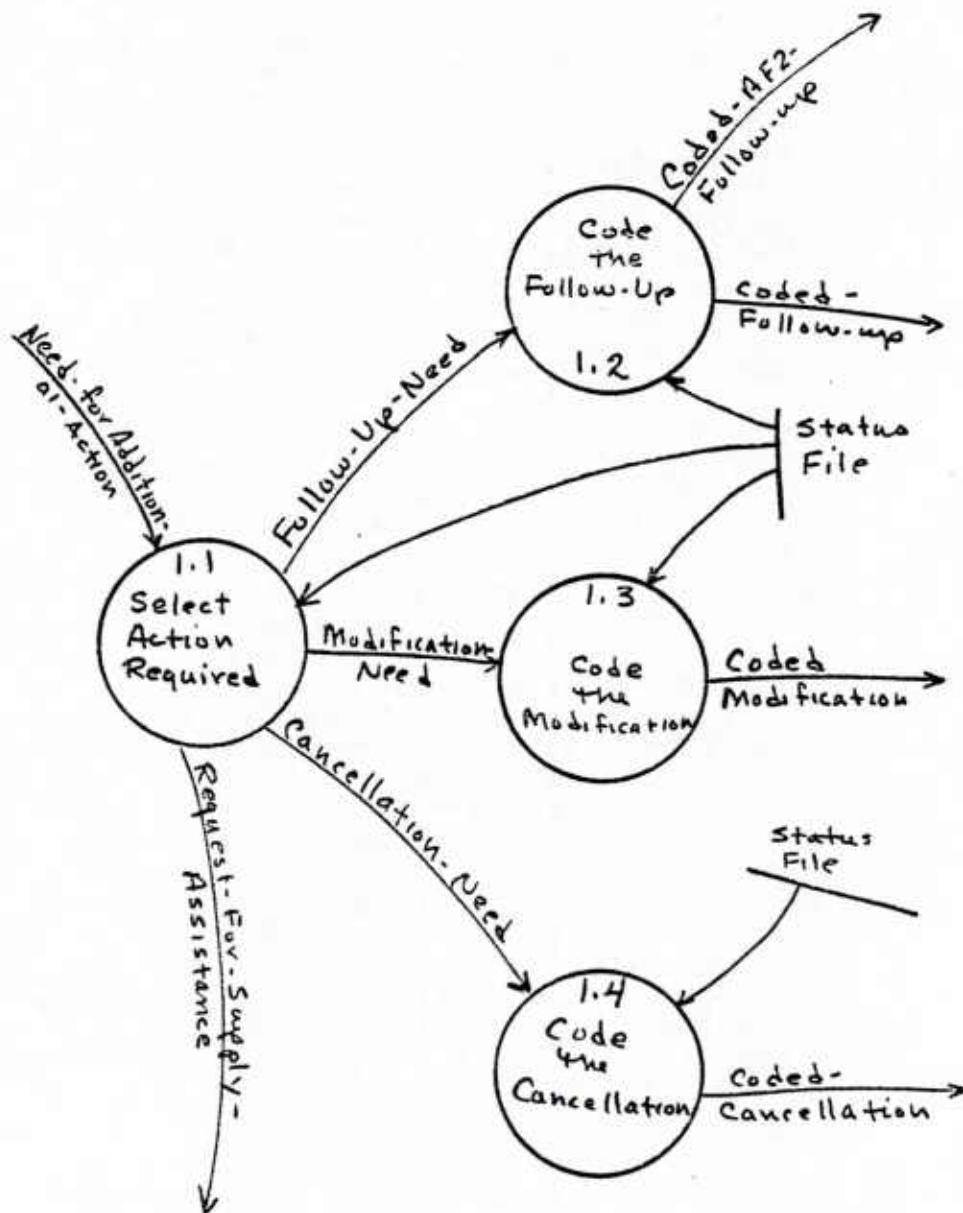
### Valid-Modification-Data

Document Identifier in columns 1-3 plus  
Routing Identifier from Original Requisition, columns  
4-6 plus  
Media and Status Code from Original Requisition, column  
7 plus  
Either Most Recent Status Document Data, columns 8-59 or  
Original Requisition Data, columns 8-59 plus  
Either Original Priority Designator Code, columns 60-  
61 or  
Most Recent Status Document Priority Designator Codes  
columns 60-61 or  
Modified (New) Priority Designator Code, columns 60-  
61 plus  
Either Original Required Availability Date columns 62-  
64 or  
Most Recent Status Document Requiring Availability Date  
Columns 62-64 or  
Modified (New) Required Availability Date, columns 62-  
64 plus  
Original Requisition Advice Code, columns 65-66 plus  
Either Most Recent Status Document Data, columns 67-  
80 or  
Original Requisition Data, columns 67-80

FMS Customer Guide--Structured Controlled Version









- 1.1 For each Need-for-Additional-Action you get
- If there is a need for Supply Assistance (the original or changed requisition must be a priority Ø1-Ø8) (Get requisition information from Status-File) and you will have an emergency if you do not get the material):
    - First find out how soon you have to know if you can get Supply Assistance.
    - If it is the same day then use the telephone to tell the ILCO of your need.
    - Or if you must know the same week, send the Request-for-Supply Assistance by DD Form 173 (Message).
    - If not that soon, then send the Request-for-Supply-Assistance by letter (use the same information sequence as in DD Form 173).
  - If not (no need for Supply Assistance) you will find the reason for the Need-for-Additional-Action in the Precoded Problem Identifier or Narrative Problem Statement.
    - If the reason is a Follow-Up, look in the Status-File for the last date an action was done on that requisition. Make sure the requisition number is the same. Add the date to the Need-for-Additional-Action and send out Follow-Up-Need.
    - Or, if the reason is a Modification, also make sure the requisition number is the same as the information in the Status-File, write the Modification-Required on the Need-for-Additional-Action, and send out Modification-Need.
    - If not (cancellation), be sure the Requisition Number is the same as in the Status-File. Get the quantity you do not need from the Need-for-Additional-Action (Full Requisition or Partial Requisition Quantity). Put the number at the top of the Need-for-Additional-Action and send out Cancellation-Need.

- 1.2 For each Follow-Up-Need you get  
Get the Requisition Information from the Status-  
File.  
If a Cancellation has been sent to the U.S., send  
out  
Coded Follow-Up with code AK2.  
Or if you have been sent a status with Estimated  
Shipping Date (ESD) but that date is too late  
for your Air Force need, send out a Coded-  
Follow-Up with code AFC.  
Or if:  
1. You have already sent a code AF2 Follow-  
Up to the U.S. and  
2. You still need the material and  
3. 10 days have past and  
4. No status has been sent to you by the ILCO  
Then, send out a Coded-Follow-Up with code AT1,  
AT4 or AT5 (the number at the end of the code  
is the same as the number at the end of the  
document identifier code (DIC) of the original  
requisition.)  
If none of the above, send out a Coded-AF2-Follow-  
Up.

- 1.3 For each Modification-Need you get  
Get the Requisition-Information from the Status-  
File.  
Be sure the Requisition Number is the same on the  
Modification-Need and in the Status-File.  
Send out a Coded-Modification with code AM1,  
AM4 or AM5 (The number at the end of the code  
is the same as the number at the end of the  
document identifier code (DIC) of the original  
requisition).

- 1.4 For each Cancellation-Need you get  
Get the Requisition Information from the Status-File.  
Be sure the Requisition Number is the same on the  
Cancellation-Need and in the Status-File. Send  
out a Coded-Cancellation with Code AC2.

- 2.0 For each Coded-AF2-Follow-Up received  
 Compare received information with data in the  
 Status-File for that Requisition Number.  
 Take the action indicated in the following table/  
 rules.

Condition (Defined Below)	Rules													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Status	R	R	R	R	N	N	N	N	R	R	R	R	R	R
ESD	R	R	R	R	N	N	N	N	N	N	R	R	N	N
Priority	1	1	2	2	1	1	2	2	1	1	3	3	2	2
Source	N	N	N	N	N	N	N	N	A	A	C	C	A	A
Time	3	9	4	1	1	7	2	8	6	12	5	10	13	14
Action	2	3	2	3	1	3	2	3	2	3	2	3	1	3

CONDITION DEFINITIONS:

Status: Received = R  
 Not received = N  
 Estimated Shipping Date:  
 (ESD) Received = R  
 Not received = N  
 Priority: Ø1-Ø8 = 1  
 Ø8-15 = 2  
 Any = 3  
 Supply Source: Contact = C  
 Non contact = N  
 Any = A

ACTIONS:

1. Output Valid-AF2-Follow-Up-Data with Original Requisition Data.
2. Output Valid-AF2-Follow-Up-Data with Most Recent Status Document Data.
3. Reject to originator with note that follow-up time not yet reached.

TIME CONDITIONS: (Add 5 days if Original Requisition submitted by mail.)

5	5 days since Original Requisition	=	1
5	" "	=	7
15	" "	=	2
15	" "	=	8
5	" past ESD	=	3
5	" "	=	9
15	" "	=	4
15	" "	=	10
60	" "	=	5
60	" "	=	11
20	" since last status without ESD	=	6
20	" " " "	=	12
35	" " " "	=	13
35	" " " "	=	14

- 3.0 For each Coded-Follow-Up with Codes AT1, AT2 or AT3,  
Look at information in the Status-File for that  
Requisition Number.
- If information in the Status-File shows an AF2,  
Follow-Up has already been sent, and if it was  
sent over 10 days in the past, and the ILCO  
has not sent back any status, send out Valid-  
Follow-Up-Data with the same Document Identifier  
Code (DIC) you got (AT1, AT2 or AT3) and with  
the latest Status Document Data in columns 7-80.
- If information shows the 10 days has not past, send  
the Follow-Up back to the office that first sent  
it out with a note that says Follow-Up time is  
not here yet.
- If information does not show an AF2 Follow-Up has  
already been sent, send the Follow-Up back to  
the process before this with a note that it is  
not correctly coded.
- For each Coded-Follow-Up with Code AFC  
Look at information in the Status-File for that  
Requisition Number.
- If original requisition was priority Ø1-Ø8 and
1. You have a supply status and
  2. The ESD in the file is too late and
  3. You do not have a Shipment Status
- Then send out Valid-Follow-Up-Data with Code AFC  
Document Identifier Code and the latest  
Status Document Data in columns 7-80.
- If you do have Shipment Status, send the Follow-  
Up back to the office that first sent it out  
with a note that says you already have a  
Shipping Status.
- For each Coded-Follow-Up with Code AK2  
Look at information in the Status-File for that  
Requisition Number.
- If it is 15 or more days since the Cancellation was  
sent and no status has been sent back, send out  
Valid-Follow-Up-Data with Code AK2 Document  
Identifier Code and the original requisition  
data.
- If status has been sent back and it is 35 days since  
you got it, send Valid-Follow-Up-Data with Code  
AK2 Document Identifier Code and the original  
requisition data.
- If status has been sent back but it has not been 35  
days, send the Follow-Up back to the office that  
first sent it out with a note that says it is not  
yet time for a Follow-Up.
- If it has not been 15 days since the Cancellation was  
sent, send the following back to the office that  
first sent it out with a note that says it is  
too soon for a Follow-Up.

4.0 For each Coded-Modification

Look at the information in the Status-File for that Requisition Number.

If you have been sent a status but it was not BA or BV and shipment status has not yet been sent and

If Changed Requisition Priority is needed, send out Valid-Modification-Data with the same Document Identifier Code you got (AM1, AM4 or AM5) and with the latest status document data but with the new Modified Priority Designator Code.

Or if a changed Required Delivery Date is needed, send out Valid-Modification-Data with the same Document Identifier Code you got (AM1, AM4, or AM5) and with the latest status document data but with the new Modified Required Delivery Date.

Or if both the Required Delivery Date and the Requisition Priority need a change, send out Valid-Modification-Data with the same Document Identifier Code you got (AM1, AM4, or AM5) and with the latest status document data but with the new, Modified Priority Designator Code and the new, Modified Requirement Delivery Date.

If you have not yet been sent status, do the same as above but use the Original Requisition Data in place of the latest status document data.

If you have been sent status BA or BV or you have been sent shipping status (DIC AS2 or AU2) send the Modification back to the office that sent the Modification out with a note that says what status has been sent to you.



5.0 For each Coded-Cancellation

Look at the information in the Status-File for that Requisition Number

If Shipping Status Codes DIC AS2 or AU2 have not been sent to you

If no supply status has yet been sent, send out Valid-Cancellation-Data with AC2 Document Identifier Code and with the Original Requisition Data

If supply status has been sent, send out Valid-Cancellation-Data with AC2 Document Identifier Code and with the latest status document data.

If shipping status AS2 or AU2 has been sent to you, send the Cancellation back to the office that sent the Cancellation out with a note that says that shipping status has already been sent to you.

6.0 For each Valid-Cancellation-Data  
    If you have AUTODIN  
        Send Cancellation by AUTODIN on DD Form 1348m  
    Or send Cancellation by Message, DD Form 173.  
For each Valid-Modification-Data  
    If you have AUTODIN  
        Send Modification by AUTODIN on DD Form 1348m  
    Or (No AUTODIN)  
        If Modification is priority Ø1-Ø8  
            Send Modification by Message, DD Form 173  
        Or (Priority Ø9-15) send by mail on a DD Form  
            1348 or in a letter with the same information  
            and in the same sequence.  
For each Valid-Follow-Up-Data or Valid-AF2-Follow-Up-Data  
    If you have AUTODIN  
        Send Follow-Up by AUTODIN on DD Form 1348m  
    Or (No AUTODIN)  
        If Follow-Up is priority Ø1-Ø8  
            Send Follow-Up by Message, DD Form 173  
        Or (Priority Ø9-15) send Follow-Up by mail on a  
            DD Form 1348 or in a letter with the same  
            information in the same sequence.  
After each/any of the above actions, make a record  
of what you did and put it in the Status-File  
for that Requisition Number.

## DICTIONARY

### Cancellation

Proper Form plus  
Valid Cancellation Data

### Cancellation-Need

Requisition Number plus  
Full Requisition Quantity or  
Partial requisition quantity

### Coded-AF2-Follow-Up

Follow up Need plus  
AF2 Code

### Coded-Cancellation

Cancellation Need plus  
AC2 Code

### Coded-Follow-Up

Follow up Need plus  
AT 1 code or  
AT 4 code or  
AT 5 code or  
AFC code or  
AK 2 code

### Coded-Modification

Modification Need plus  
AM 1 code or  
AM 4 code or  
AM 5 code

### Follow-Up

Proper Form plus  
Valid Follow-up Data

### Follow-up-Need

Need for Additional Action plus  
Date of last action

## DICTIONARY CONTINUED

### Modification

Proper Form plus  
Valid Modification Data

### Modification-Need

Requisition Number plus  
Modification-Required

### Modification-Required

Either a Changed Requisition Priority or  
Changed Required Delivery Date

### Need-for-Additional-Action

Requisition Number plus  
Narrative Problem Statement and  
(optional) Pre-Coded Problem Identifier

### Proper-Form

DD Form 1348m or  
DD Form 1348 or  
DD Form 173 or  
Letter Format (Formulated as DD Form 173)

### Request-for-Supply-Assistance

Requisition Number (Document Numbers Involved) plus  
NSN or  
P/N plus  
Case Identifier plus  
Justification for request

### Status-File

Requisition Number plus  
Status Reports/Requisition Information (History Data  
on an identified Requisition, all actions taken  
since original submittal.)

### Valid-AF 2-Follow-Up-Data

AF 2 Document Identifier plus  
Routing Identifier from original Requisition, columns  
4-6 plus  
Either Most Recent Status Document Data in columns 7-80  
or Original Requisition Date in columns 7-80

## DICTIONARY CONTINUED

### Valid-Cancellation-Data

Document Identifier plus  
Routing Identifier Code from Original Requisition,  
columns 4-6 plus  
Either Original Requisition Data, columns 7-24 or  
Most Recent Status Document Data, columns 7-24 plus  
Quantity to be cancelled plus  
Either Original Requisition Data, columns 30-80 or  
Most Recent Status Document Data, columns 30-80

### Valid-Follow-up-Data

Document Identifier, in columns 1-3 plus  
Routing Identifier from Original Requisition columns 4-6  
plus  
Either Most Recent Status Document Data, in columns  
7-80 or  
Original Requisition Data, columns 7-80

### Valid-Modification-Data

Document Identifier in columns 1-3 plus  
Routing Identifier from Original Requisition, columns  
4-6 plus  
Media and Status Code from Original Requisition, column  
7 plus  
Either Most Recent Status Document Data, columns 8-59 or  
Original Requisition Data, columns 8-59 plus  
Either Original Priority Designator Code, columns 60-  
61 or  
Most Recent Status Document Priority Designator Codes  
columns 60-61 or  
Modified (New) Priority Designator Code, columns 60-  
61 plus  
Either Original Required Availability Date columns 62-  
64 or  
Most Recent Status Document Requiring Availability Date  
Columns 62-64 or  
Modified (New) Required Availability Date, columns 62-  
64 plus  
Original Requisition Advice Code, columns 65-66 plus  
Either Most Recent Status Document Data, columns 67-  
80 or  
Original Requisition Data, columns 67-80

Procedure for Reporting Discrepancies Against FMS  
Shipments--Narrative Version

U.S. SAAC PROCESSING OF STANDARD FORMS 364 (SF 364)

PROCEDURES

A. General

1. The SAAC will receive all SF 364s (original and six copies) from FMS customers in order to establish and maintain accurate control records. Qualified SF 364s (reference paragraphs II C, II E, and II F, above) will be forwarded to the appropriate ILCO for further processing as applicable. The ILCO will take what action is necessary with the DoD ICP/IM or GSA. All responses to discrepancy reports will be returned through the ILCO to the SAAC. Discrepancy reports received by the ILCO, DoD ICP/IM or GSA directly from the FMS purchaser will be forwarded to the SAAC for initial processing. These steps are necessary to ensure proper control and to prevent erroneous and incomplete responses to the FMS purchaser.

2. Action activities will process all discrepancy reports under the policies and procedures set forth in this regulation.

3. Action activities will ensure the reverse of SF 364 is fully completed and one copy of the report returned to the SAAC bearing the original signature of the individual responsible for preparation of the reply.

4. Whenever materiel is directed for return to U.S. custody, the purchasing country will be instructed to reship the materiel using the same document number under which the materiel was originally shipped, if known. Credit, if applicable, will be granted only after the DoD/GSA inventory manager has received evidence that the materiel has been received into the custody of an authorized representative of the U.S. Government.

5. The SAAC will:

a. Reject discrepancy reports which are not prepared and submitted within one year from date of shipment or billing to the FMS purchaser, whichever is later, unless it is determined that unusual and compelling circumstances involving latent defects justify consideration of the claim.

b. Reject discrepancy reports which do not contain needed data, unless such data is readily available at the SAAC.

c. Reject discrepancy reports which are below the dollar limitation contained on the DD Form 1513, or any other sales agreement with the FMS purchaser and for which there is no valid justification for the submission.

d. Reject duplicate discrepancy reports, except those discrepancy reports which are resubmitted to contest a previous decision.



e. Determine whether the purchaser has been billed for the shipment in question to facilitate further processing. When proper, place billing in suspense pending resolution of the discrepancy.

f. Process to the FMS purchaser replies and/or denials to discrepancy reports.

g. Process adjustments to the FMS purchaser's billing listing identified as required by DoD Instruction 2140.3, when credit is received from ILCOs, DoD ICPs/IMs, shippers or GSA.

B. Time Standards

1. Submission of SF 364

a. FMS Purchasers. Within 365 calendar days from date custody of the item is transferred to the purchaser's authorized representative or billing to the FMS purchaser whichever is later.

b. SAAC. Within 15 calendar days from date of receipt of the report from the FMS purchaser.

c. ILCO. Within 15 calendar days from date of receipt of the report from the SAAC.

2. Reply to SF 364

a. DoD ICP/IM or GSA. Within 75 calendar days from date of receipt of the report from the ILCO. Where a final reply cannot be provided within the established time frame, an interim reply will be furnished within the allowed 75 days through the ILCO to the SAAC. The failure to meet the established time frame must be caused by reasons outside the control of the DoD ICP/IM or GSA. Interim replies must cite the reason(s) for delay and provide a projected completion date.

b. ILCO. Within 15 calendar days from date of receipt of the report from the DoD ICP/IM or GSA.

c. SAAC. With the first available FMS monthly statement of transactions issued after the receipt of SF 364 from the ILCO and/or DoD ICP/IM.

C. Distribution

The SAAC will forward the original and four copies to the appropriate ILCO.



STANDARD FORM 364. GUIDANCE AND INSTRUCTIONS FOR  
PREPARATION

Items 1 through 15, below, are included as guidance for action activities as to how the SF 364 should be completed by the FMS purchaser. The instructions for items 16 through 21 are mandatory for all action activities completing SF 364s.

- Item 1. Date of Preparation. Report is prepared in sequence of year, month, and day. This sequence should also be used in all date entries, i.e., March 23, 1978 is written 78 MAR 23 and June 1, 1978 is written 78 JUNE 01.
- Item 2. Report Number. The control number of the RODD consisting of one alpha character to identify the initiating office in-country, four numeric characters for number control, two alpha characters for the purchaser country and three alpha characters of the FMS case designator, i.e., A0010-JA-KBD. For any unnumbered RODDs received, SAAC will assign number X9000 to X9999 and so advise the FMS purchaser on the receipted copy. A suffix code "C" added to the report number indicates the RODD has been contested.
- Item 3. To. The mailing address of the SAAC: AFAPC/FS, Denver, Colorado 80279.
- Item 4. From. Name and mailing address of the FMS purchaser (consignee). The "in-the-clear" address will be entered.
- Item 5a. Shipper's Name. Name and address of the shipper (consignor).
- Item 5b. Number and Date of Invoice. Number and date of vendor's invoice. Copy of invoice should be attached to SF 364.
- Item 6. Transportation Document. The type of transportation document, GBL, CBL, manifest, waybill, insured/certified parcel post number, or transportation control number (TCN) and the identifying number assigned to such document. This is a mandatory entry when shipment received was made via traceable means, e.g.,

GBL, CBL, etc. The following statement should be included in item 12--"shortage has been verified as not being transportation related," when shortages are involved.

- Item 7a. Shipper's Number. The shipment number (when more than one shipment is made under a contract or requisition) and contract/document number (e.g., contract, purchase order, etc.). Only one document number should be included on each SF 364.
- Item 7b. Office Administering Contract. Name, address and ZIP Code of the contract administration office.
- Item 8. Requisitioner's Number. Enter the requisitioning activity's number, e.g., requisition, purchase request, etc., including suffix. The applicable requisition document number should be entered even though a contract/purchase order is involved.
- Item 9a. NSN/Part Number and Nomenclature. If item received is different than item shown on shipping documents, or different from item ordered, each item should be shown on a separate line.
- Item 9b. Unit of Issue. Unit of Issue as billed or indicated on shipping document for each item listed in item 9a.
- Item 9c. Quantity Shipped/Billed. Quantity of item shipped or billed. When code C1 is applicable, enter the quantity and the materiel condition code. Military Standard Requisitioning and Issue Procedures (MILSTRIP) of the item when shipped, e.g., 980A as shown on shipping document.
- Item 9d. Quantity Received. Quantity of item received.
- Item 10a. Discrepancy/Deficiency Quantity. The discrepant quantity. If code C1 is applicable, the quantity and the materiel condition code of the item received should be entered. If total quantity received is classified under more than one condition code, each partial quantity so classified followed by the applicable

condition code, e.g., 960A, 20F, should be entered separately. NOTE: Where quality deficiencies are involved or when overaged materiel (expired shelf life) is received, and code Q1 or C2 is applicable, the following information should be entered under item 12, remarks:

1. Manufacturer's name.
2. Contract/purchase order number if not shown in item 7a.
3. Date of manufacture, pack or expiration.
4. Lot/batch number.
5. Location of materiel.
6. Name, address and telephone number of contact.
7. Nature of complaint stating in detail why materiel is unsatisfactory. When quality deficiencies are reported, remarks should include explicit description of unsatisfactory condition to include test or inspection criteria used to determine item serviceability.

Item 10b. Discrepancy/Deficiency Unit Price. The unit price as billed or shown on shipping document.

Item 10c. Discrepancy/Deficiency Total Cost. The total value of materiel (10a x 10b).

Item 10d. Discrepancy/Deficiency Code. Nature of the discrepancy using the discrepancy/deficiency codes listed on the face of the form. If a condition exists that is not listed, code Z1 should be entered and the discrepancy/deficiency described in item 12, remarks.

Item 11. Action Code. The requested action from codes listed on the face of the form should be reflected. If action is other than that covered by listed action codes code 1Z should be used and action requested explained in item 12, remarks. Action code 1D or 1E will not be used on reports prepared to cover shipments directed by DoD stock funded activities and GSA. Materiel still required must be re-requisitioned. Action code 1E applies only to local purchase items.

Item 12. Remarks. For any supplemental information where the combination of discrepancy/deficiency codes and action codes needs clarification,

where discrepancies/deficiencies need explanation and where a breakout of cost to reports in terms of time and materials is required. Specific data such as appearance, lot/batch number, manufacture/packaging date, inspector number, inspection date, and test or inspection criteria should be entered here. Telephone number (AUTOVON/Commercial) of the individual to be contacted for additional information if different than what is entered in item 14a should be specified. If medical materiel requiring refrigeration or frozen storage is involved, the information requested on the special instruction sheet which is included with shipments of such materiel should be provided. Photos where it would assist the shipping activity in determining the cause of the discrepancy/deficiency should also be provided.

Item 13. Funding and Accounting Data. Not applicable.

Item 14a. Typed or Printed Name, Title and Phone Number of Preparing Official. Self-explanatory.

Item 14b. Signature. Self-explanatory.

Item 15. Distribution Addresses for Copies. Not applicable.

The reverse of SF 364 is to be completed by the action activity.

Item 16. From. The address of the activity preparing the reply.

Item 17. Distribution Addresses for Copies. Not applicable.

Item 18. To. Enter address of the activity indicated in item 4 on face of the form.

Item 19. Enter advice of action taken by responsible action office by placing an X in appropriate box(es).

Item 20. Enter disposition instructions by placing an X in appropriate box(es).

Item 21. Enter an X to indicate to the reporting activity that a new requisition is required if the materiel is still needed.



Procedure for Reporting Discrepancies Against FMS  
Shipments--Controlled English Version

U.S. SAAC PROCESSING OF STANDARD FORMS 364 (SF 364)

PROCEDURES

1. The SAAC will get all SF 364s (original and 6 copies) from FMS customers so it can make and keep complete records, with accuracy, to be used to control this procedure. SF 364s that follow the rules of paragraph IIC, IIE and IIF, above, can be sent to the correct ILCO for the next step in procedure. The ILCO will control the procedure of sending the SF 364 to the DoD ICP/IM or GSA so they can do their part of the procedure. When the DoD ICP/IM or GSA is completely done with the SF 364 they will send it back to the ILCO. The ILCO will send it back to SAAC. If the ILCO, the DoD ICP/IM or GSA are sent an SF 364 directly from the FMS purchaser they will send them directly to SAAC for control. These steps are needed to have correct control and to be sure correct, complete SF 364s are sent back to the FMS purchaser.
2. Action activities will follow all the rules of this procedure in how to correctly do the steps needed to send the correct information back to an FMS purchaser when the U.S. gets an SF 364.
3. Action activities will complete the back side of the SF 364 and inspect it to be sure it is done correctly. 1 copy of the SF 364 with the signature of the person who made the inspection will be sent to the SAAC.
4. When the material will be sent back to the U.S., tell the FMS purchaser to send the material and to use the same document number that was used to send the material to the FMS purchaser, if this number is known. Credit, if it should be given, will only be given after the DoD/GSA Inventory Manager knows for sure that the U.S. Government has gotten the material.
5. The SAAC will
  - a. Not take SF 364s that are made and sent in after 1 year from date of shipment or billing to the FMS purchaser (use the date which is later) unless special reasons or special rules (for example, about latent defects) say the SF 364 is acceptable.
  - b. Not take SF 364s that do not have needed information unless they can get that information easily at the SAAC.
  - c. Not take SF 364s for a dollar amount less than what the DD Form 1513 says, or any other sales agreement with the FMS purchaser and for which there is no acceptable reason to take it.

d. Not take duplicate SF 364s unless they are sent back to contest an earlier completed SF 364 sent to the FMS purchaser.

e. Find out if the FMS purchaser has been sent a bill for the shipment that the SF 364 says has a discrepancy. When correct, put a temporary hold on the bill until the SF 364 procedure is complete.

f. Send to the FMS purchaser the completed SF 364, when SAAC inspection is done and the information to be sent is acceptable to the SAAC.

g. Change the FMS Billing File of the FMS purchaser so the Billing Amount is correct, by following the procedures of DoD Instruction 2140.3. This will be done only if the ILCO, DoD ICP/IMs, shippers or GSA say so.

#### TIME STANDARDS

1. Times for control of a new SF 364 to the U.S.

a. FMS Purchasers. SF 364 must be sent in to the SAAC before 365 days have gone by since the purchaser really got title to the material or the bill was sent to the FMS purchaser. The latest date will be used to know this.

b. SAAC. Before 15 days has gone by since the SAAC got the SF 364 from the FMS purchaser.

c. ILCO. Before 15 days has gone by since the ILCO got the SF 364 from the SAAC.

2. Times for control of SF 364 to be sent to the FMS purchaser.

a. DoD ICP/IM or GSA. Before 75 days have gone by since the DoD ICP/IM or GSA got the SF 364 from the ILCO. If more time is needed, send a temporary report, before the 75 days have gone by, to the ILCO (who will send it to the SAAC). Failure to complete the procedure before 75 days have gone by must be caused by some reason not controlled by or able to be corrected by the DoD ICP/IM or GSA. The temporary report must tell what the reason is (or reasons are).

b. ILCO. Before 15 days have gone by since ILCO got the completed SF 364 from the DoD ICP/IM or GSA.

c. SAAC. With the next FMS Monthly Statement of Transactions sent to the FMS purchaser after the SAAC got the completed SF 364 from the ILCO and/or DoD ICP/IM.

STANDARD FORM 364. GUIDANCE AND INSTRUCTIONS FOR  
PREPARATION

Items 1 through 15, below, are included as guidance for action activities as to how the SF 364 should be completed by the FMS purchaser. The instructions for items 16 through 21 are mandatory for all action activities completing SF 364s.

- Item 1. Date of Preparation. Report is prepared in sequence of year, month, and day. This sequence should also be used in all date entries, i.e., March 23, 1978 is written 78 MAR 23 and June 1, 1978 is written 78 JUNE 01.
- Item 2. Report Number. The control number of the RODD consisting of one alpha character to identify the initiating office in-country, four numeric characters for number control, two alpha characters for the purchaser country and three alpha characters of the FMS case designator, i.e., A0010-JA-KBD. For any unnumbered RODDs received, SAAC will assign number X9000 to X9999 and so advise the FMS purchaser on the receipted copy. A suffix code "C" added to the report number indicates the RODD has been contested.
- Item 3. To. The mailing address of the SAAC: AFAPC/FS, Denver, Colorado 80279.
- Item 4. From. Name and mailing address of the FMS purchaser (consignee). The "in-the-clear" address will be entered.
- Item 5a. Shipper's Name. Name and address of the shipper (consignor).
- Item 5b. Number and Date of Invoice. Number and date of vendor's invoice. Copy of invoice should be attached to SF 364.
- Item 6. Transportation Document. The type of transportation document, GBL, CBL, manifest, waybill, insured/certified parcel post number, or transportation control number (TCN) and the identifying number assigned to such document. This is a mandatory entry when shipment received was made via traceable means, e.g.,



GBL, CBL, etc. The following statement should be included in item 12--"shortage has been verified as not being transportation related," when shortages are involved.

- Item 7a. Shipper's Number. The shipment number (when more than one shipment is made under a contract or requisition) and contract/document number (e.g., contract, purchase order, etc.). Only one document number should be included on each SF 364.
- Item 7b. Office Administering Contract. Name, address and ZIP Code of the contract administration office.
- Item 8. Requisitioner's Number. Enter the requisitioning activity's number, e.g., requisition, purchase request, etc., including suffix. The applicable requisition document number should be entered even though a contract/purchase order is involved.
- Item 9a. NSN/Part Number and Nomenclature. If item received is different than item shown on shipping documents, or different from item ordered, each item should be shown on a separate line.
- Item 9b. Unit of Issue. Unit of Issue as billed or indicated on shipping document for each item listed in item 9a.
- Item 9c. Quantity Shipped/Billed. Quantity of item shipped or billed. When code C1 is applicable, enter the quantity and the materiel condition code. Military Standard Requisitioning and Issue Procedures (MILSTRIP) of the item when shipped, e.g., 980A as shown on shipping document.
- Item 9d. Quantity Received. Quantity of item received.
- Item 10a. Discrepancy/Deficiency Quantity. The discrepant quantity. If code C1 is applicable, the quantity and the materiel condition code of the item received should be entered. If total quantity received is classified under more than one condition code, each partial quantity so classified followed by the applicable

condition code, e.g., 960A, 20F, should be entered separately. NOTE: Where quality deficiencies are involved or when overaged materiel (expired shelf life) is received, and code Q1 or C2 is applicable, the following information should be entered under item 12, remarks:

1. Manufacturer's name.
2. Contract/purchase order number if not shown in item 7a.
3. Date of manufacture, pack or expiration.
4. Lot/batch number.
5. Location of materiel.
6. Name, address and telephone number of contact.
7. Nature of complaint stating in detail why materiel is unsatisfactory. When quality deficiencies are reported, remarks should include explicit description of unsatisfactory condition to include test or inspection criteria used to determine item serviceability.

Item 10b. Discrepancy/Deficiency Unit Price. The unit price as billed or shown on shipping document.

Item 10c. Discrepancy/Deficiency Total Cost. The total value of materiel (10a x 10b).

Item 10d. Discrepancy/Deficiency Code. Nature of the discrepancy using the discrepancy/deficiency codes listed on the face of the form. If a condition exists that is not listed, code Z1 should be entered and the discrepancy/deficiency described in item 12, remarks.

Item 11. Action Code. The requested action from codes listed on the face of the form should be reflected. If action is other than that covered by listed action codes code 1Z should be used and action requested explained in item 12, remarks. Action code 1D or 1E will not be used on reports prepared to cover shipments directed by DoD stock funded activities and GSA. Materiel still required must be re-requisitioned. Action code 1E applies only to local purchase items.

Item 12. Remarks. For any supplemental information where the combination of discrepancy/deficiency codes and action codes needs clarification,

where discrepancies/deficiencies need explanation and where a breakout of cost to reports in terms of time and materials is required. Specific data such as appearance, lot/batch number, manufacture/packaging date, inspector number, inspection date, and test or inspection criteria should be entered here. Telephone number (AUTOVON/Commercial) of the individual to be contacted for additional information if different than what is entered in item 14a should be specified. If medical materiel requiring refrigeration or frozen storage is involved, the information requested on the special instruction sheet which is included with shipments of such materiel should be provided. Photos where it would assist the shipping activity in determining the cause of the discrepancy/deficiency should also be provided.

Item 13. Funding and Accounting Data. Not applicable.

Item 14a. Typed or Printed Name, Title and Phone Number of Preparing Official. Self-explanatory.

Item 14b. Signature. Self-explanatory.

Item 15. Distribution Addresses for Copies. Not applicable.

The reverse of SF 364 is to be completed by the action activity.

Item 16. From. The address of the activity preparing the reply.

Item 17. Distribution Addresses for Copies. Not applicable.

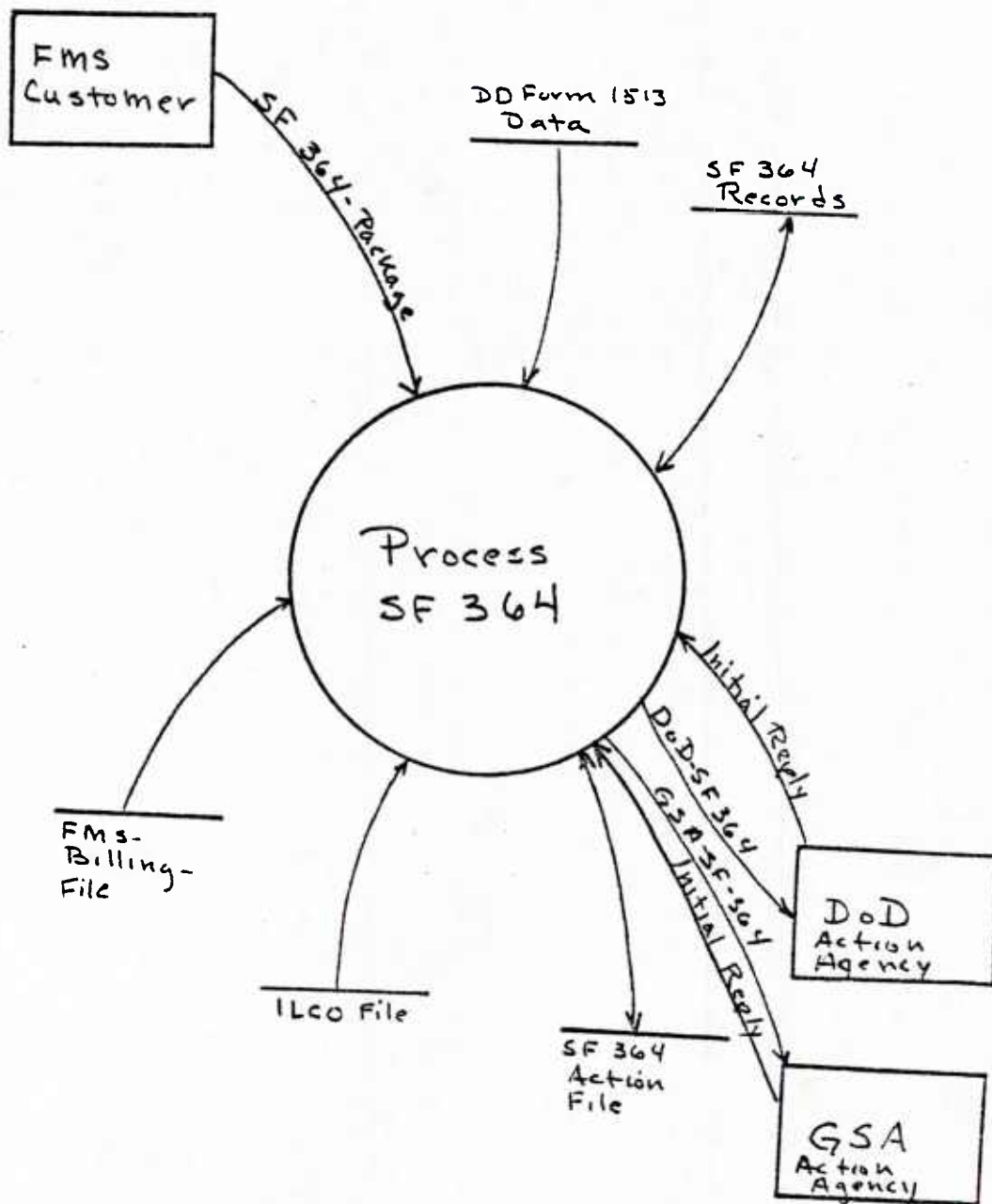
Item 18. To. Enter address of the activity indicated in item 4 on face of the form.

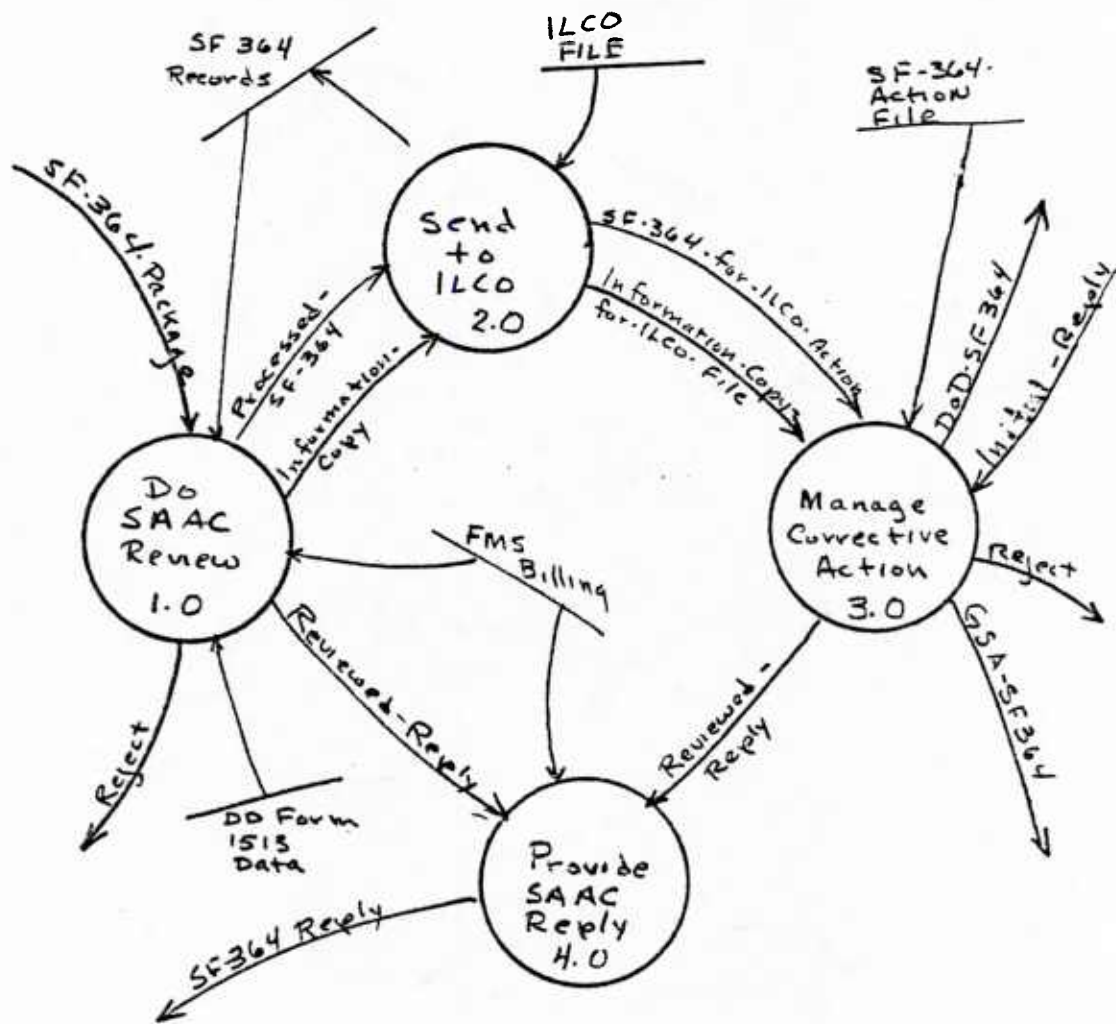
Item 19. Enter advice of action taken by responsible action office by placing an X in appropriate box(es).

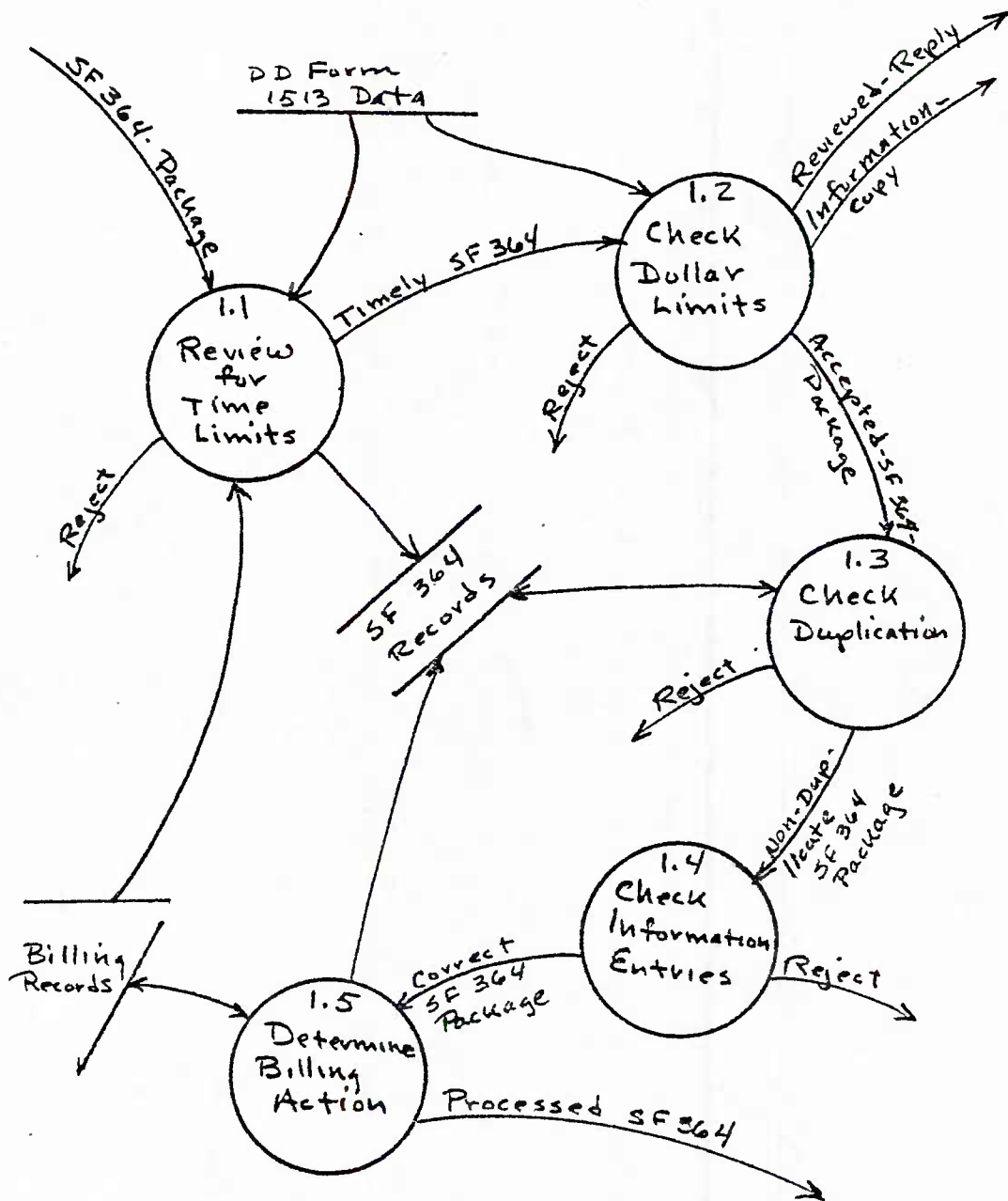
Item 20. Enter disposition instructions by placing an X in appropriate box(es).

Item 21. Enter an X to indicate to the reporting activity that a new requisition is required if the materiel is still needed.

Procedure for Reporting Discrepancies Against FMS  
Shipments--Structured Version









- 1.1 For each SF-364-Package received
  1. Establish 15 day suspense in SF-364 records  
If suspense not cleared in 15 days followup and  
locate SF-364  
Else, ignore.
  2. Inspect form for date information.  
If date of submittal over one year from shipment  
billing date in FMS-Billing-File determine if  
special circumstances apply or DD Form 1513  
allows over one year  
If not - reject to originating country with  
explanation as to processing time requirement  
Else, output Timely-SF-364 package.



- 1.2 For each Timely-SF-364 Package received  
Determine Dollar Limit of Claim from the DD Form  
1513 File.  
If below dollar limit reject to originating  
country with explanation of dollar limit  
Else,  
If above dollar limit but less than \$100 and  
IAW DoD 4000.25-7-M, approve and output  
Reviewed-Reply and Information-Copy  
Else (Not able to be approved by SAAC)  
Output Accepted-SF-364-Package.

1.3 For each Accepted-SF-364-Package  
If files reveal this is a duplicate report -  
determine if it is to contest a previous  
decision  
If not, reject to originating country, marked  
"duplicate submittal"  
Else (contesting a previous decision) continue.  
Else (non-duplicate or contesting a previous  
decision)  
Output Non-Duplicate-SF-364-Package.

- 1.4 For each Non-Duplicate-SF-364-Package received  
If all data entries, as defined are not present or  
easily available in SAAC, reject to originating  
country with request for needed data.  
Else, (All data available) output Correct-SF-364-  
Package.

- 1.5 For each Correct-SF-364-Package
  1. Query FMS-Billing-File to determine whether purchaser has been billed.  
If so, note this fact in the SF-364-Package  
Place Billing in Suspense.  
Else, note this fact in the SF-364-Package,  
continue processing.
  2. Output Processed-SF-364
  3. Update SF-364 Record with actions taken.

2.0 For each Processed-SF-364 or Information-Copy received  
Obtain the address of the applicable ILCO from the  
ILCO file and output SF-364 for ILCO Action or  
Information-Copy for ILCO file, respectively,  
Post processing date to SF-364 record to remove  
suspense date.

3.0 For each Information-Copy for ILCO File  
Place Data in SF-364-Action-File (History Data)  
For each SF-364 for ILCO Action  
Identify Action Agency  
Remove File Copies of SF-364  
Output DoD SF-364 or GSA-SF-364 to Action Agency  
within 15 days of receipt from SAAC  
Establish Suspense date in File copies and put in  
SF-364-Action-File  
Follow-up in 75 days if no reply has been received.  
For each Initial-Reply received  
If an interim reply (request for more time), notify  
SAAC in Reviewed-Reply--establish new suspense  
date in SF-364-Action-File  
Else, review for acceptability  
If acceptable, output with Initial Acceptance  
as Reviewed-Reply, mark file copy that sus-  
pense has been completed  
Else, reject to source with reason for rejection  
and output Reviewed Reply with Request for  
more time--establish new suspense date in  
SF-364-Action-File.

4.0 For each Reviewed-Reply received, review proposed reply.  
If credit is given by the ILCO or DoD manager  
Adjust the FMS Billing Data in accordance with  
DoD Instruction 2140.3.  
Prepare and output SF-364-Reply with the next  
FMS Monthly Statement of Transactions.  
Else (credit not due or not granted)  
Review reply for clarity and proper completion  
(Reverse of SF-364 is properly filled out)  
Prepare and Output SF-364-Reply with the next  
FMS Monthly Statement of Transactions.



DICTIONARY

Accepted-SF-364-Package

Self Defining

Contract-Administration-Office

Name of Office plus  
Address plus  
Zip Code

Correct-SF-364-Package

Self Defining

Date-of-Preparation

Year (2 Digit), month, day Number  
(For example: 80 JAN 27)

DD-Form-1513-Data

DD Form 1513, including but not limited to  
Deficiency Reporting Time Limits  
Dollar Limitation of Discrepancy Reports

DoD-SF-364

SF 364 for ILCO Action minus  
File Copies plus  
DoD Action Agency Address

Discrepancy/Deficiency-Code

Code from Front of Form (as applicable) or  
Code Z1

Discrepancy/Deficiency-Quantity

Number Short plus  
Condition Code and/or  
Number Over plus  
Condition Code and  
Quality Information

Discrepancy/Deficiency-Unit-Price

Item Unit Price (from shipping/billing document)

DICTIONARY CONTINUED

FMS-Billing-File

Invoice Number plus  
Requisition data plus  
Transportation Document Data plus  
NSN/PN and Nomenclature plus  
Quantity Billed plus  
Billing Date plus  
Billing Amount

FMS-Purchaser-Address

In the Clear Address of Consignee

GSA-SF-364

SF 364 for ILCO Action minus  
File Copies plus  
GSA Action Agency Address

ILCO-Addresses

U.S. Army Address  
U.S. Navy Address  
U.S. Air Force Address

Information-Copy

Copy of Accepted Claim for Less than \$100

Initial-Reply

(DoD SF 364 or  
GSA SF 364) plus  
Agency reply

Invoice-Number-and-Date

Consignor's/Vendor's Invoice Number plus  
Date of Invoice

Name/Title/Phone-Number-of-Preparer

Self Defining

Non-Duplicate-SF-364-Package

Self Defining

DICTIONARY CONTINUED

NSN/Part-Number-and-Nomenclature

NATO Stock Number plus  
Item/Manufacturer's Part Number plus  
Item Nomenclature

Processed-SF-364

SF 364 Package minus  
Two copies of SF 364 for file

Quality-Information

Manufacturer's Name plus  
(Date of Manufacture or  
Date of Pack or  
Date of Expiration) plus  
Lot/batch number plus  
Location of materiel plus  
Contact name/address/phone number plus  
Narrative description of deficiency, criteria and method  
of detecting the deficiency.

Quantity-Shipped/Billed

Quantity Shown on Shipping Document or  
Quantity Shown on Billing Document, as applicable or  
Quantity Shipped plus  
Materiel Condition Code (For Code C1)

Quantity-Received

Self Defining

Remarks

One or more of the following may be entered  
Explanation of Code Z1 in block 10d  
Explanation of Code 1Z in block 11  
Cost Breakout per item  
Other Contact Names/Addresses/Phone Numbers  
Special Medical Material Information  
Photographs Provided Should be listed here  
Any other supporting/special information

DICTIONARY CONTINUED

Report-Number

Office Designator plus  
Control Number plus  
Purchaser Country Code plus  
FMS Case Designator plus  
Optional Suffix "C"

Requisition-Action-Code

Code from front of Form (as applicable) or  
Code 1Z

Requisitioner's-Number

Complete Number used by Originating Country/Office on  
Original Requisition

Reviewed-Reply

Initial Reply plus  
Initial Acceptance or  
Accepted Claim for less than \$100 or  
Request for more time

RODD-Type

Shipping Discrepancy or  
Packaging Deficiency

SAAC-Address

Mailing Address of SAAC:  
AFAFC/FS  
Denver, Colorado 80279

SF-364

Standard Form 364 plus  
Data for Items on Front of Form. These include  
RODD Type  
Date of Preparation  
Report Number  
SAAC Address  
FMS Purchaser Address  
Shipper's Name  
Invoice Number and Date  
Transportation Document Data  
Shipper's Number

DICTIONARY CONTINUED

SF-364 (Continued)

Contract Administration Office  
Requisitioner's Number  
NSN/PN and Nomenclature  
Unit of Issue  
Quantity Shipped/Billed  
Quantity Received  
Discrepancy/Deficiency Quantity  
Discrepancy/Deficiency Unit Price  
Discrepancy/Deficiency Total Cost  
Discrepancy/Deficiency Code  
Requisition Action Code  
Remarks  
Name/Title/Phone Number of Preparer  
Signature

SF-364-Action-File

Country I.D. plus  
Case designator (if applicable)  
History Data

SF-364-For-ILCO-Action

Processed SF-364 plus  
ILCO Address

SF-364-Package

SF 364 plus  
6 copies plus  
Invoice Copy  
(As prepared by the originating country)

SF-364-Reply

SF 364 plus  
Official SAAC Reply  
FMS Monthly Statement of Transactions

Shipper's-Name

Name of Shipper (Consignor) plus  
In the Clear Address of Shipper

DICTIONARY CONTINUED

Shipper's-Number

Contract Number or  
Contract Number plus  
Shipment number (for multiple shipments under one contract)

Signature

Self Defining

Standard-Form-364

Self Defining - The Form Itself

Timely-SF-364

Self Defining

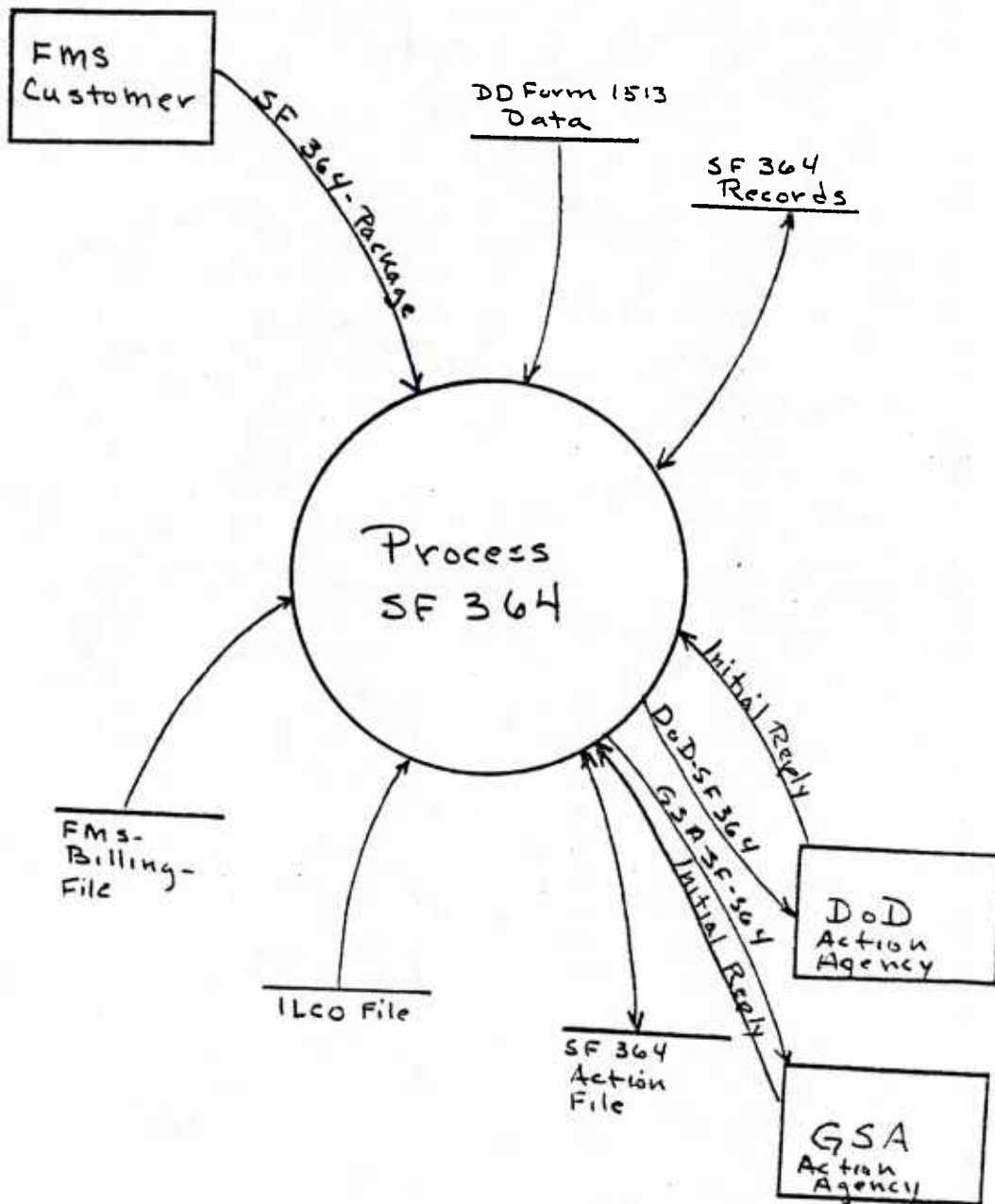
Transportation-Document-Data

Type of Transportation Document plus  
Shortage Statement (if applicable)

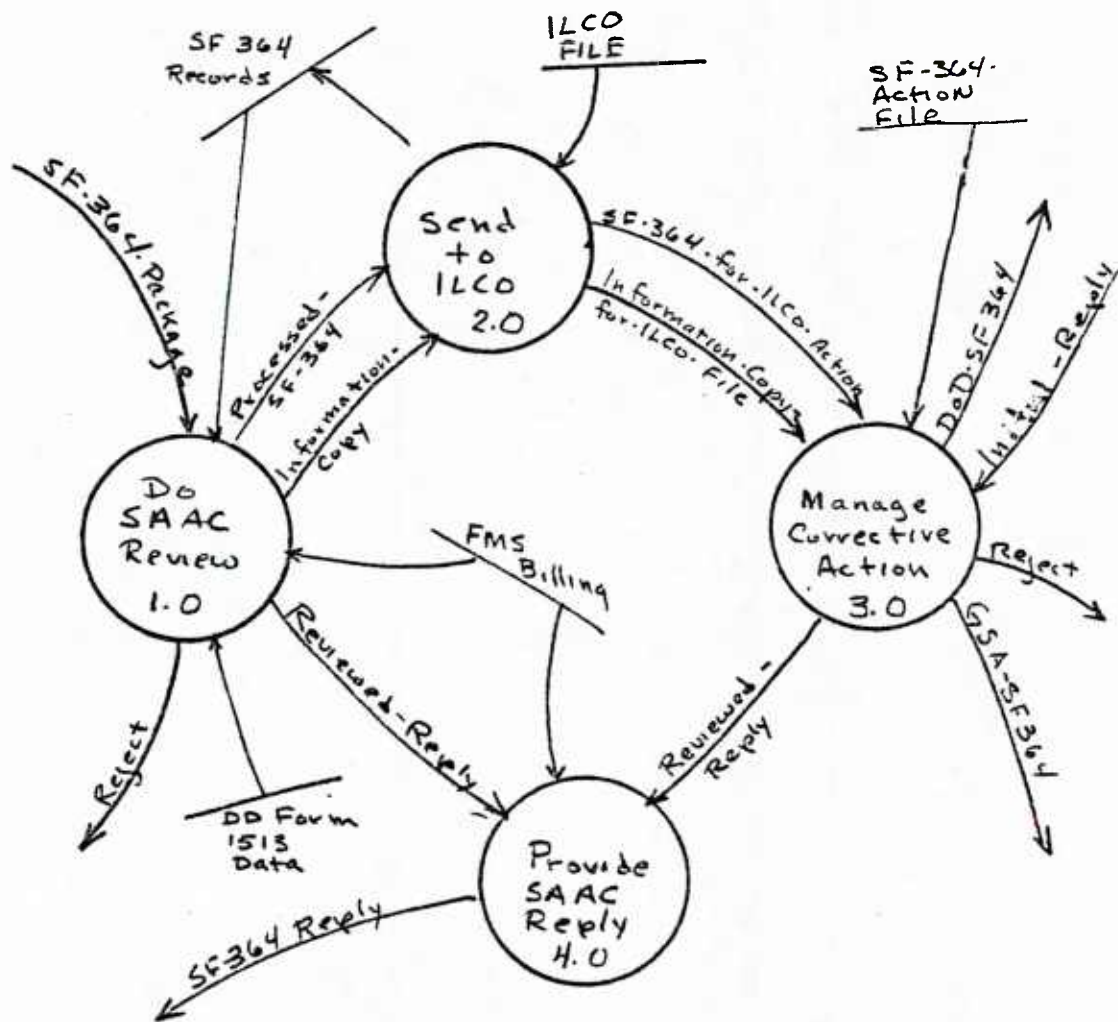
Unit of Issue

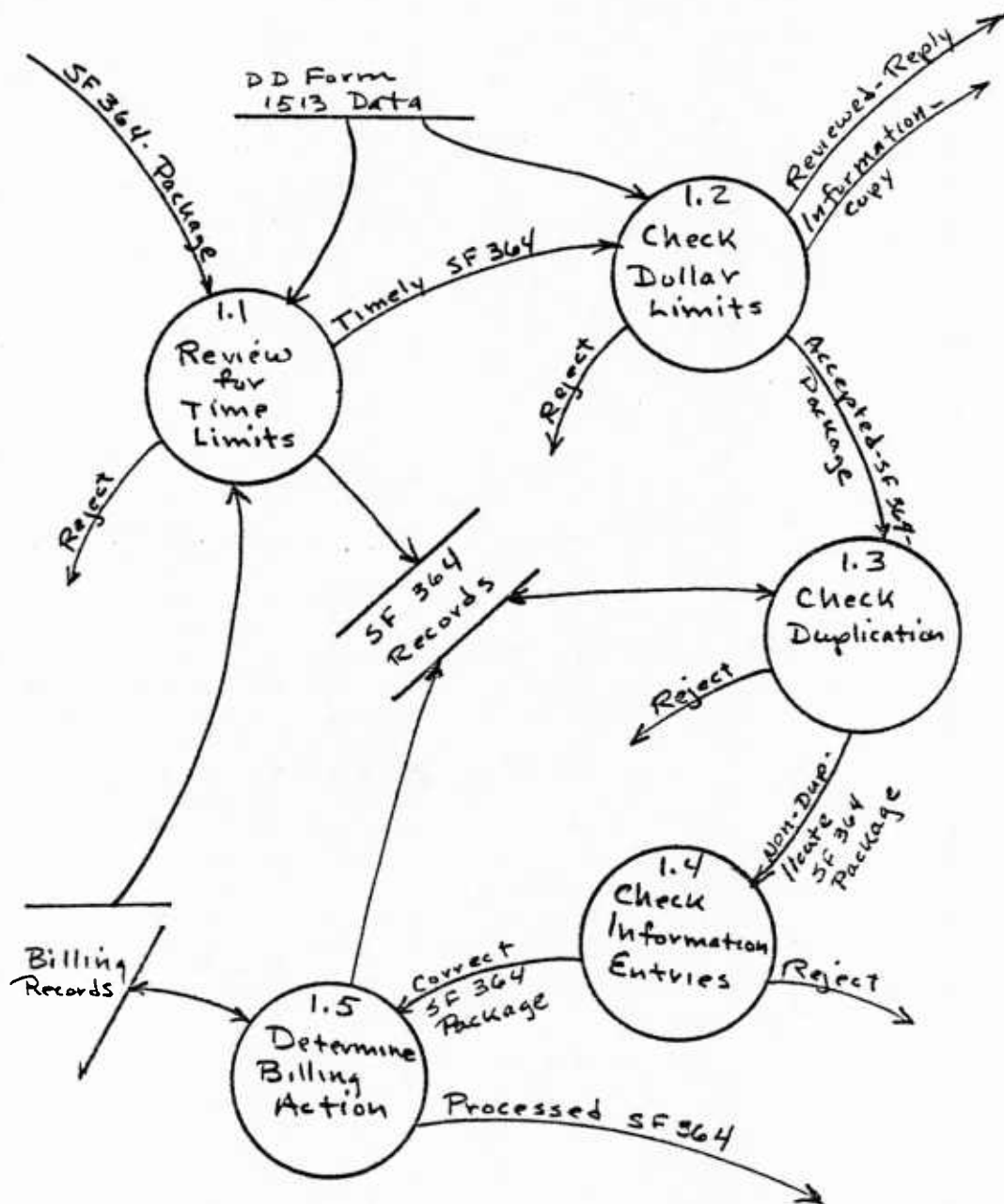
Self Defining

Procedure for Reporting Discrepancies Against FMS Shipments--Structured Controlled Version









1.1 For each SF-364-Package

1. Make a new record in the SF-364 records  
Put a 15 day time limit in the record to get the report that the SF-364 has been sent to the ILCO.

If you do not get the report in 15 days, go find out why it has not been sent. Write the answer in the record.

If you get the report, put it in the file and remove the 15 day time limit.

2. Look at the information, for the requisition number or shipping document data on the SF-364, in the FMS-Billing-File.

If there are more than 365 days between the Billing Date and the Date-of-Preparation of the SF-364 and

If there are also more than 365 days between the shipment date and the Date-of-Preparation of the SF-364 and

If there is no special reason in the SF-364 Remarks block that says the SF-364 was sent in late

Look in the DD-Form-1513-Data to see if there is a reason there to say the SF-364 can be sent in late.

If less than 365 days or the remarks block has a special reason or the DD-Form-1513 says the SF-364 can be sent in late, send out Timely-SF-364 to next process.

If over 365 days and no special reason is in the remarks block and the DD-Form-1513-Data does not say the SF-364 can be late, Send the SF-364 back to the country that sent it to you with a note saying that it is too late to send in an SF-364.

1.2 For each Timely-SF-364-Package

Find the dollar limit of the original DD-Form

1513

If SF-364 is for less than the dollar limit, send back to the country that sent the SF-364-Package to you with a note saying it is below the dollar limit.

If SF-364 is for more than the dollar limit but for less than \$100 and the rules of DoD 4000.27-7-M say you can, approve the SF-364 and send out Reviewed-Reply and Information-Copy.

But if you cannot approve (over \$100 or DoD 4000.27-7-M does not say so) send out Accepted-SF-364-Package.

- 1.3 For each Accepted-SF-364-Package  
Look in SF-364 records for a duplicate SF-364.  
If files show this is a duplicate, see if it  
says, sent in to contest an earlier decision.  
If it is not, send it back to the country that  
sent the SF-364 in. Mark it "Duplicate."  
If it is to contest an earlier decision,  
continue.  
If not a duplicate, or to contest an earlier  
decision,  
Send out a Non-Duplicate-SF-364-Package.

1.4 For each Non-Duplicate-SF-364-Package

Look at all data on the form.

If it is all there (as shown in the dictionary)

Or if you can find what is not there easily in  
SAAC,

Send out Correct-SF-364-Package.

If not there and not easily available in SAAC,

Send it back to the country that sent the SF-  
364 in, with a note saying what data is needed.

1.5 For each Correct-SF-364-Package

1. Look in the FMS-Billing-File and see if a bill has been sent to the FMS customer.  
If so, write a note on the SF-364 that says this and put a temporary hold on the billing action in the Billing Records.  
If not, write a note that says this on the SF-364.
2. Send out Processed-SF-364-Package.
3. If you put a temporary hold on the billing, put a record that says so in the SF-364 Records.



- 2.0 For each Processed-SF-364  
    Get the address of the ILCO for the SF-364 from the  
        ILCO File and send out SF-364-For-ILCO-Action  
For each Information-Copy  
    Get the address of the ILCO from the Information-  
        Copy from the ILCO File and send out Information-  
        Copy For ILCO File.  
For both the above, make a record of the date you sent  
    either one and put it in the SF-364 records.

- 3.0 For each Information-Copy for ILCO File you get  
Put in SF-364-Action-File.
- For each SF-364-For-ILCO-Action  
Get the identification of the Action Agency (DoD  
ICP/IM or GSA)  
Take off the record copies of the SF-364.  
Send out DoD-SF-364 or GSA-SF-364 to Action Agency  
before 15 days are over since you got the SF-364  
from the SAAC.
- Mark the date you sent the SF-364 to the Action  
Agency on the record copies of the SF-364 and put  
copies in SF-364-Action-File.
- If Initial-Reply not sent by Action Agency before 75  
days are over, tell them they have not sent an  
Initial-Reply and that it is needed immediately.
- For each Initial-Reply  
If it says that more time is needed, tell SAAC  
immediately and send the Reviewed-Reply with this  
information to SAAC on the same day you get it.  
Put this information in the SF-364 File.
- If it does not say more time is needed, inspect the  
information in the reply.
- If acceptable, send out Reviewed-Reply with Initial  
acceptance. Put this information in the SF-364-  
Action-File record.
- If not acceptable, send it back to the Action Agency  
with a note why it is not acceptable. Send  
Reviewed-Reply to SAAC with Request for More Time.  
Put this information in the SF-364-Action-File  
record.

4.0 For each Reviewed-Reply

If the Action Agency or the ILCO says that the Billing Amount is to be changed, make the change in the FMS-Billing-File by the rules of DoDI 2140.3.

Send out SF-364-Reply with the next FMS Monthly Statement of Transactions.

If the Billing Amount is not to be changed, be sure the back side of the SF-364 tells why and the reason is acceptable.

Send out SF-364-Reply with the next FMS Monthly Statement of Transactions.

DICTIONARY

Accepted-SF-364-Package

Self Defining

Contract-Administration-Office

Name of Office plus  
Address plus  
Zip Code

Correct-SF-364-Package

Self Defining

Date-of-Preparation

Year (2 Digit), month, day Number  
(For example: 80 JAN 27)

DD-Form-1513-Data

DD Form 1513, including but not limited to  
Deficiency Reporting Time Limits  
Dollar Limitation of Discrepancy Reports

DoD-SF-364

SF 364 for ILCO Action minus  
File Copies plus  
DoD Action Agency Address

Discrepancy/Deficiency-Code

Code from Front of Form (as applicable) or  
Code Z1

Discrepancy/Deficiency-Quantity

Number Short plus  
Condition Code and/or  
Number Over plus  
Condition Code and  
Quality Information

Discrepancy/Deficiency-Unit-Price

Item Unit Price (from shipping/billing document)

## DICTIONARY CONTINUED

### FMS-Billing-File

Invoice Number plus  
Requisition data plus  
Transportation Document Data plus  
NSN/PN and Nomenclature plus  
Quantity Billed plus  
Billing Date plus  
Billing Amount

### FMS-Purchaser-Address

In the Clear Address of Consignee

### GSA-SF-364

SF 364 for ILCO Action minus  
File Copies plus  
GSA Action Agency Address

### ILCO-Addresses

U.S. Army Address  
U.S. Navy Address  
U.S. Air Force Address

### Information-Copy

Copy of Accepted Claim for Less than \$100

### Initial-Reply

(DoD SF 364 or  
GSA SF 364) plus  
Agency reply

### Invoice-Number-and-Date

Consignor's/Vendor's Invoice Number plus  
Date of Invoice

### Name/Title/Phone-Number-of-Preparer

Self Defining

### Non-Duplicate-SF-364-Package

Self Defining

DICTIONARY CONTINUED

NSN/Part-Number-and-Nomenclature

NATO Stock Number plus  
Item/Manufacturer's Part Number plus  
Item Nomenclature

Processed-SF-364

SF 364 Package minus  
Two copies of SF 364 for file

Quality-Information

Manufacturer's Name plus  
(Date of Manufacture or  
Date of Pack or  
Date of Expiration) plus  
Lot/batch number plus  
Location of materiel plus  
Contact name/address/phone number plus  
Narrative description of deficiency, criteria and method  
of detecting the deficiency.

Quantity-Shipped/Billed

Quantity Shown on Shipping Document or  
Quantity Shown on Billing Document, as applicable or  
Quantity Shipped plus  
Materiel Condition Code (For Code C1)

Quantity-Received

Self Defining

Remarks

One or more of the following may be entered  
Explanation of Code Z1 in block 10d  
Explanation of Code 1Z in block 11  
Cost Breakout per item  
Other Contact Names/Addresses/Phone Numbers  
Special Medical Material Information  
Photographs Provided Should be listed here  
Any other supporting/special information

## DICTIONARY CONTINUED

### Report-Number

Office Designator plus  
Control Number plus  
Purchaser Country Code plus  
FMS Case Designator plus  
Optional Suffix "C"

### Requisition-Action-Code

Code from front of Form (as applicable) or  
Code 1Z

### Requisitioner's-Number

Complete Number used by Originating Country/Office on  
Original Requisition

### Reviewed-Reply

Initial Reply plus  
Initial Acceptance or  
Accepted Claim for less than \$100 or  
Request for more time

### RODD-Type

Shipping Discrepancy or  
Packaging Deficiency

### SAAC-Address

Mailing Address of SAAC:  
AFAFC/FS  
Denver, Colorado 80279

### SF-364

Standard Form 364 plus  
Data for Items on Front of Form. These include  
RODD Type  
Date of Preparation  
Report Number  
SAAC Address  
FMS Purchaser Address  
Shipper's Name  
Invoice Number and Date  
Transportation Document Data  
Shipper's Number



## DICTIONARY CONTINUED

### SF-364 (Continued)

Contract Administration Office  
Requisitioner's Number  
NSN/PN and Nomenclature  
Unit of Issue  
Quantity Shipped/Billed  
Quantity Received  
Discrepancy/Deficiency Quantity  
Discrepancy/Deficiency Unit Price  
Discrepancy/Deficiency Total Cost  
Discrepancy/Deficiency Code  
Requisition Action Code  
Remarks  
Name/Title/Phone Number of Preparer  
Signature

### SF-364-Action-File

Country I.D. plus  
Case designator (if applicable)  
History Data

### SF-364-For-ILCO-Action

Processed SF-364 plus  
ILCO Address

### SF-364-Package

SF 364 plus  
6 copies plus  
Invoice Copy  
(As prepared by the originating country)

### SF-364-Reply

SF 364 plus  
Official SAAC Reply  
FMS Monthly Statement of Transactions

### Shipper's-Name

Name of Shipper (Consignor) plus  
In the Clear Address of Shipper

DICTIONARY CONTINUED

Shipper's-Number

Contract Number or  
Contract Number plus  
Shipment number (for multiple shipments under one contract)

Signature

Self Defining

Standard-Form-364

Self Defining - The Form Itself

Timely-SF-364

Self Defining

Transportation-Document-Data

Type of Transportation Document plus  
Shortage Statement (if applicable)

Unit of Issue

Self Defining

AFM 67-1 Excerpt--Narrative Version

134. PROCESSING DEFECTIVE WARRANTED ITEMS

a. Base supply/base support activities will:

(1) Receive from maintenance the defective item with an AFM Form 350, "Reparable Item Processing Tag," when the item becomes defective prior to the expiration date of the time/usage period covered by the warranty.

(2) Warranted items which are subject to reporting of quality deficiency data and SF368, "Quality Deficiency Report," exhibits will be reported according to procedures in TO 0035D-54 and processed according to procedures outlined in Paragraph 138.

(3) If the defective item is authorized for field level repair, determine whether the item should be repaired or if disposition should be requested from the SM/IM. If the item is mission essential and in critical short supply and non-availability will adversely affect the mission capability of the activity concerned, the item should be repaired locally and returned to service. On those defective warranted items which are not turned in to supply but are repaired on site, maintenance will notify supply of their decision to repair. Base supply, in turn, will advise the SM/IM by message (including the information in Paragraph 134a(6) that the item was repaired and returned to service.

(4) The RIW items will not be repaired locally, except in such cases where the warranty identification tags and/or equipment technical order specifies that such repair is authorized. Procedures for RIW items are contained in Paragraph 138.

(5) On items for which disposition instructions are required, attach a DD Form 1575, "Suspended Tag-Materiel,"/ 1575-1, "Suspended Label-Materiel," to the item to identify the item as being suspended and in litigation (code "L")-- Stock held pending negotiation.

(6) Notify the applicable SM/IM (TO 0025-115 or chapter 2, part two) by message of the defective item furnishing the NSN, contract number, and all data available regarding the defect and request disposition instructions.

(7) Make disposition of the item according to SM/IM instructions.

b. The SM/IM, upon receipt of request for disposition instructions from a base supply or base support activity, will:

(1) Review the data received and advise:

(a) The PCO if the warranty is to be exercised and the contract was awarded by the SM/IM ALC.

(b) The production management branch, directorate of procurement and production (PPLM) if the warranty is to be exercised and the contract was awarded by an activity other than the SM/IM ALC.

(2) Furnish disposition instructions or advice as to action being taken to the base supply or base support activity as soon as possible but not more than seven calendar days after receipt of request. On items being negotiated between the PCO/administrative contracting officer (ACO) and the contractor, this will represent an interim reply. Final reply should be forwarded within a maximum period of 30 days. If an undue delay precludes meeting the 30 day time period, furnish the base supply officer detailed information.

(3) Furnish the ALC/materiel analysis branch (MMEA) an information copy of all reports and final disposition action for warranted items which pertain to quality deficiencies.

#### 138. RELIABILITY IMPROVEMENT WARRANTY PROCEDURES

a. The RIW items will be identified as project number 390, project nickname PACER WARRANT.

b. Special procedures for handling RIW items will be found in applicable equipment technical orders. Minimal directions will be contained on high visibility labels on each item as well as on the outside of the container in which the item is shipped.

c. Except for special procedures as contained in the equipment technical order, RIW materiel will be handled under normal supply procedures.

AFM 67-1 Excerpt--Controlled Version

134. PROCEDURE FOR WARRANTY ITEMS WITH A DEFECT

a. Base supply/base support activities will:

(1) Get from maintenance the item with the defect and AFTO Form 350 "Reparable Item Processing Tag," when the item has a defect before the warranty period is done.

(2) For warranty items which must be reported because of bad quality and SF368, "Quality Deficiency Report," exhibits follow the procedures in TO 00-35D-54. This will be done according to paragraph 138.

(3) If the item with the defect is approved to have repair done in the field, see if the item can have the repair done there or if the SM/IM has to say what will be done with the item. If the item is mission essential and in critical short supply and if the item were not available, it would cause a problem for the user, do the repair at this location and send to the user. Maintenance will tell supply about the warranty items with a defect which are not sent to supply but on which repair was done in the field. Supply will tell the SM/IM, including information in Paragraph 134 a(6), that the repair was done and the item is being used.

(4) Repair will not be done on RIW Items on location except when the warranty identification and/or equipment T.O. says such repair is approved. Procedures for RIW Items are found in paragraph 138.

(5) On items where instructions on what will be done with them are needed, fasten a DD Form 1575, "Suspended Tag-Material,"/1575-1, "Suspended Label-Materiel," to the item for identification as an item being suspended and in litigation (code "L")-Send the item to storage until the SM/IM tells what to do with it.

(6) Tell the correct SM/IM (TO 00 25-115 or chapter 2, part 2) of the item with the defect. Give the NSN, contract number and all information you have about the defect and ask for instructions about what to do.

(7) Send out or keep item according to instructions from the SM/IM.

b. When a base supply or base support activity needs to know what to do with an item, the SM/IM will:

(1) Look at the information he/she gets and tell:

(a) The PCO if the warranty is to be used and the contract award was made by the SM/IM ALC.

(b) The production management branch, directorate of procurement and production (PPLM), if the warranty is to be used and the contract award was made by other than the SM/IM ALC.



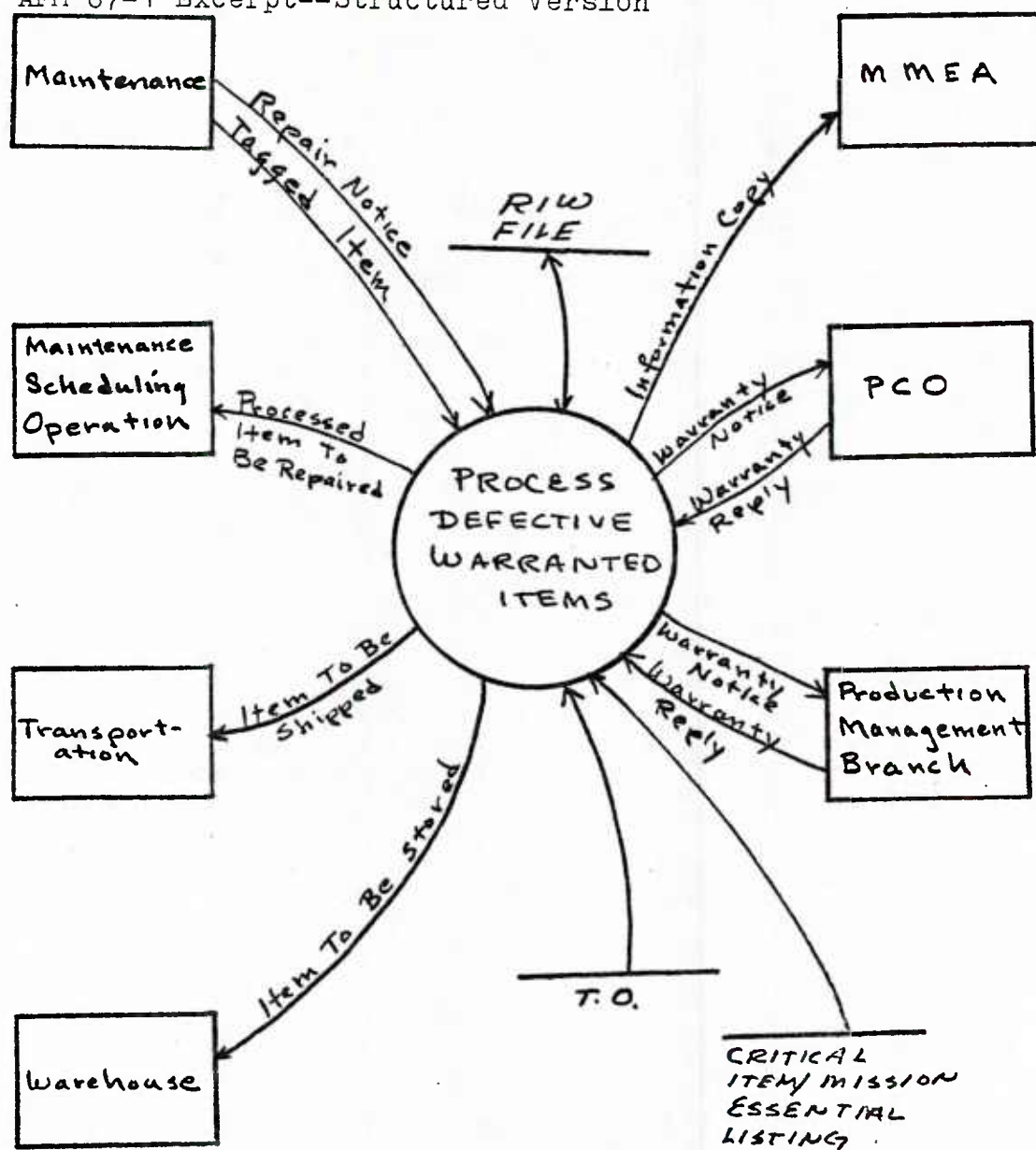
(2) Give to the base supply or base support activity distribution instructions or say what action is to be done as soon as possible. This must be sent to the base not more than 7 calendar days after they ask for instructions when specific instructions cannot be given (the PCO/ACO are not done with the contractor) send a temporary report. Specific instructions will then be sent not later than 30 calendar days. If it is not possible to tell them by the 30 day time period then give an explanation to the base supply officer.

(3) Give the ALC/materiel analysis branch (MMEA) a copy of all reports and a list of what was done for warranty items that have to do with quality defects.

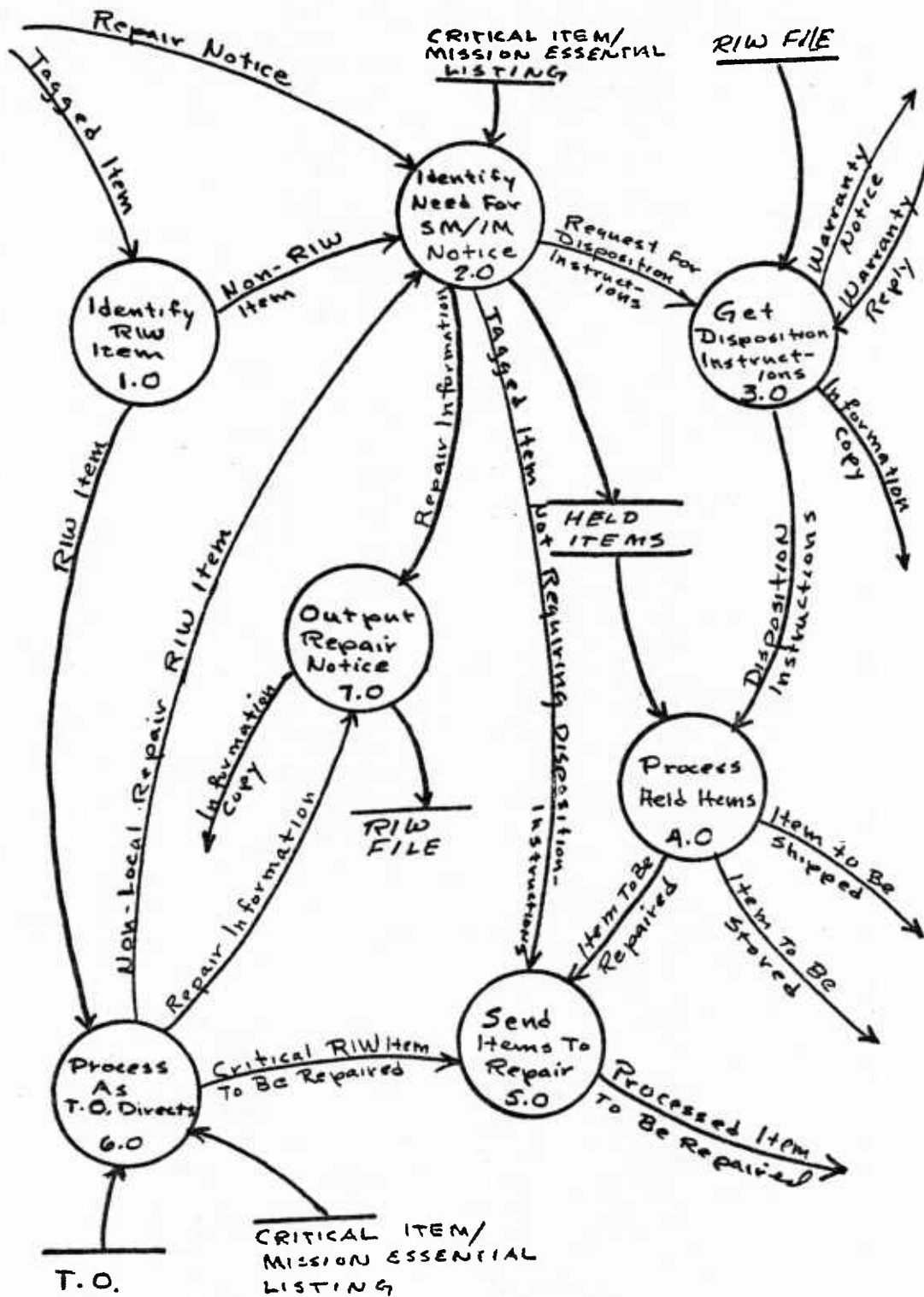
### 138. RELIABILITY IMPROVEMENT WARRANTY PROCEDURES

- a. The RIW Items will be known by project number 390, project nickname PACER WARRANT.
- b. Special procedures about RIW items will be found in the technical order for that item. Minimum instructions will be found on special identification on each item, as well as on the outside of the package in which the item is moved.
- c. Except for these special procedures use normal supply procedures.

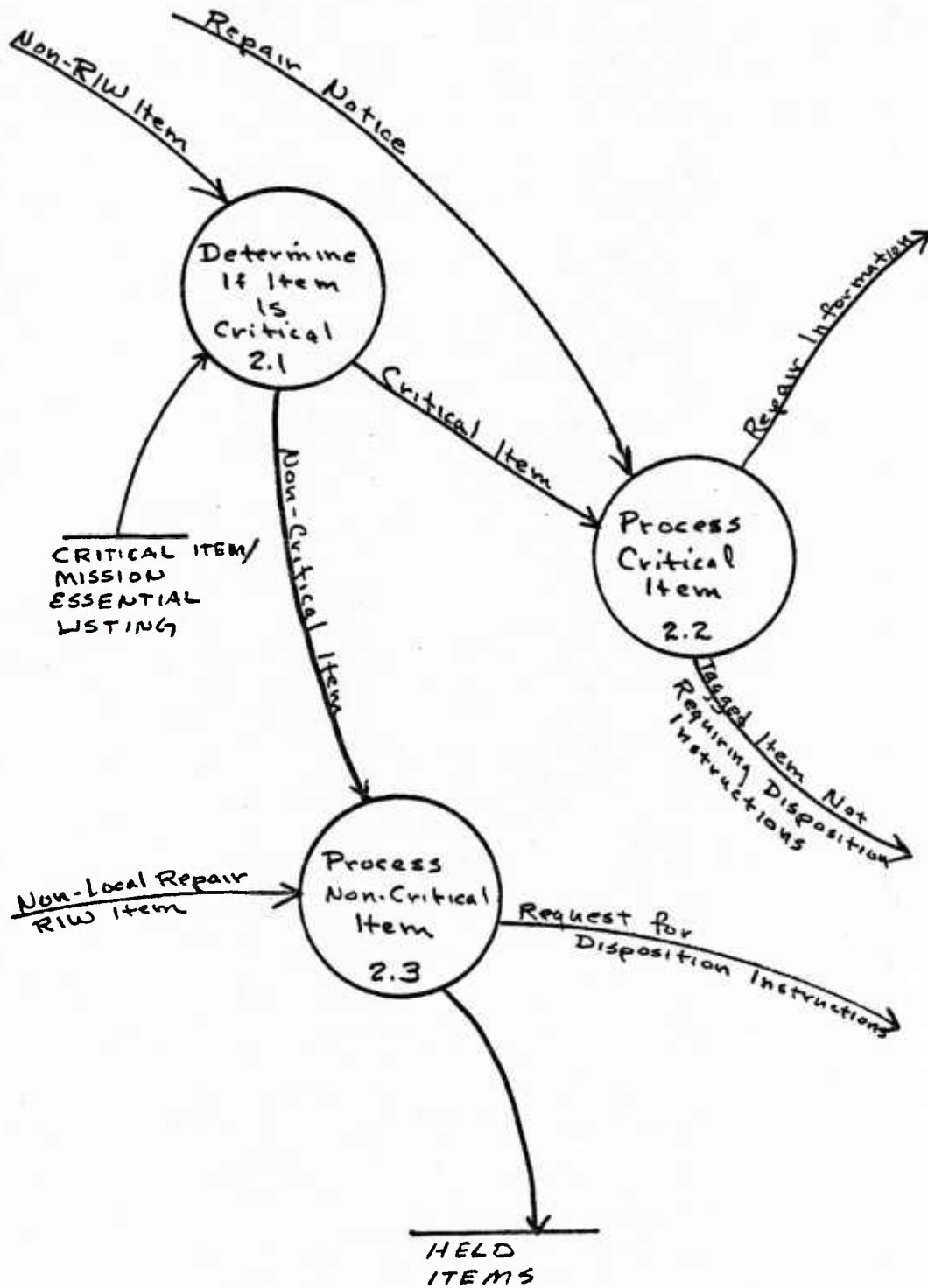
AFM 67-1 Excerpt--Structured Version







- 1.0 For each Tagged-Item received  
Examine AFTO Form 350 and the item.  
If the AFTO Form 350 or the item is marked  
"PACER WARRANT" process as an RIW-Item.  
Else, process as a Non-RIW-Item.



- 2.1 For each Non-RIW-Item received  
Look in Critical-Item/Mission-Essential-Listing for  
the item NSN.  
If listed, process as a Critical-Item and forward  
to Critical-Item processing area.  
Else, process as a Non-critical-Item.

2.2 For each Critical-Item received

1. Identify SM/IM
2. Output Repair-Information to the SM/IM
3. Output item as Tagged-Item-Not-Requiring-  
Disposition-Instructions.

For each Repair-Notice received from Maintenance

1. Identify SM/IM
2. Output Repair-Information to the SM/IM.

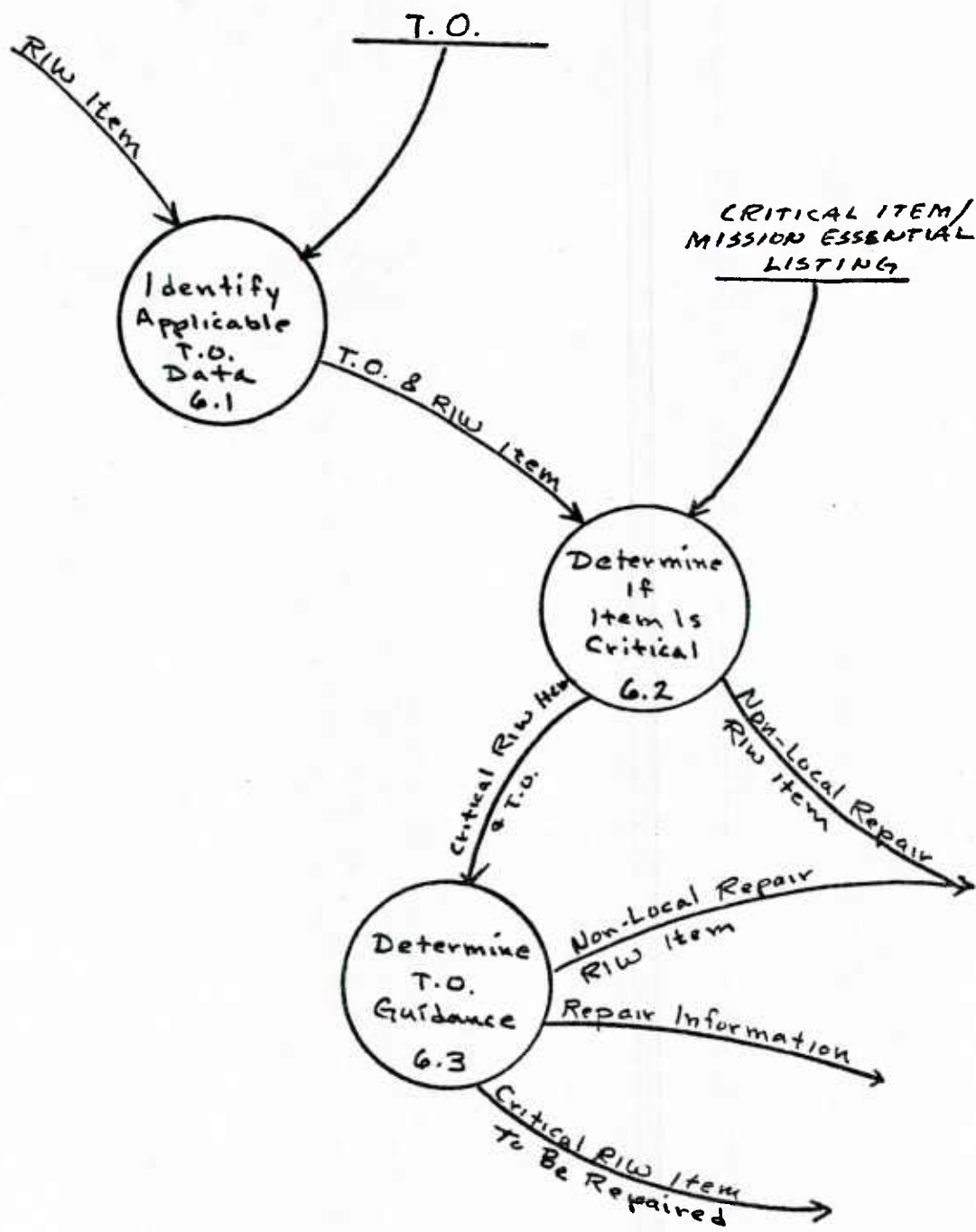
- 2.3 For each Non-Critical-Item or Non-Local-Repair-RIW-Item received
1. Identify SM/IM
  2. Output Request-for-Disposition-Instructions to SM/IM
  3. Attach completed DD Form 1575, "Suspended Tag-Material" or 1575-1 "Suspended Label-Material" to the item or package
  4. Place in Held-Item storage location.

- 3.0 For each Request-for-Disposition-Instruction received
1. Identify Contract/Warranty terms (from the RIW-File).
    - If warranty to be invoked--identify buyer.
    - If SM/IM ALC output Warranty-Notice to the to the SM-ALC PCO.
    - Else, output Warranty-Notice to PALM (Production Management Branch).
    - Else, provide Disposition-Instructions to the Source of the Request for disposition.
  2. Output Information-Copy to MMEA.
- For each Warranty-Reply received
- Output Disposition-Instruction to Source of Request.



- 4.0 For each Disposition-Instruction received
1. Obtain RIW-Item from Held-Items.
  2. If Disposition-Instruction contains Repair Authorization, output Item-to-be-Repaired.  
Else  
If Disposition-Instruction contains Shipping Instructions, output Item-to-be-Shipped.  
Else (Disposition-Instruction contains Storage Instructions and Report of Action Being Taken) Output Item-to-be-Stored.

5.0 For each Critical-RIW-Item-to-be-Repaired and each Tagged-Item-Not-Requiring-Disposition-Instructions and each Item-to-be-Repaired that is received, output as a Processed-Item-to-be-Repaired to the maintenance scheduling operation.



- 6.1 For each RIW-Item received  
Obtain applicable T.O. and section of T.O. 00-35D-54.  
Output T.O. and RIW-Item.

6.2 For each T.O. and RIW-Item received  
Look on Critical-Item/Mission-Essential-Listing  
for the item NSN.  
If listed, output Critical-RIW-Item and T.O.(s).  
Else, output Non-Local-Repair-RIW-Item with any  
special instructions from T.O. marked on  
AFTO Form 350 on the item.

- 6.3 For each Critical-RIW-Item and T.O.(s) received  
Determine if special processing instructions/restrictions are listed in the T.O.  
If found and they prohibit local repair, output  
Non-Local-Repair-RIW-Item with any special  
instructions from T.O. marked on AFTO  
Form 350 on the item.
- Else:
1. Output Critical-RIW-Item-to-be-Repaired.  
Mark "Critical-Repair-Item/Local Repair  
Authorized" on AFTO Form 350 on the item.
  2. Identify SM/IM
  3. Output Repair-Information to the SM/IM.

7.0 For each Repair-Information received, the SM/IM will update the RIW-File (Past Action History) for that item and output an Information-Copy of the Repair-Information to MMEA.



## DICTIONARY

### Critical-Item

Defective Item  
Critical Item Identification

### Critical-Item/Mission Essential-Listing

NSN plus  
Critical Identification or  
Mission Essential Identification

### Critical-RIW-Item

RIW Item plus  
Critical Item Identification

### Critical-RIW-Item-To-Be-Repaired

Critical Item plus  
Local Repair Authorization Marking (on AFTO Form 350)

### Disposition-Instruction

Item Identification plus  
Repair Authorization or  
Shipping Instructions or  
Storage Instructions and  
Report of Action Being Taken

### Held-Items (N)

RIW Items Awaiting  
Disposition Instructions plus  
Assigned Temporary Location

### Information-Copy

Self Defining

DICTIONARY CONTINUED

Item-To-Be-Repaired

RIW Item plus  
Repair Authorization

Item-To-Be-Shipped

RIW Item plus  
Shipping Instructions

Item-To-Be-Stored

RIW Item plus  
Storage Instructions

Non-Local-Repair-RIW-Item

RIW Item plus either  
non-Critical Item Statement or  
T.O. Section forbidding local repair

Processed-Item-To-Be-Repaired

Tagged Item, or  
Critical RIW Item, or  
Item to be Repaired

Repair-Information

NSN plus  
Critical Item Statement plus  
Report of Action Taken plus  
ID of organization taking action plus  
Date

Repair-Notice

NSN plus  
Report of Action Taken

Request-for-Disposition-Instruction

Source of Request plus  
Date of Request plus

DICTIONARY CONTINUED

Request-for-Disposition-Instruction (Continued)

Item Identification plus  
Defect Information (as available) plus  
Warranty Information (if available)

RIW-File

Item Identification plus  
Contract/Warranty Terms plus  
Buyer Identification plus  
Past Action History

RIW-Item

Tagged Item plus  
Reliability Improvement Warranty I.D.

(SM/IM-ALC)-Warranty Notice

Request for Disposition Instructions plus  
Warranty Information plus  
Statement of intent to exercise plus  
Reply Required Date

Tagged-Item

Defective Item plus  
AFTO Form 350

Tagged-Item-Not-Requiring-Disposition-Instruction

Self Defining

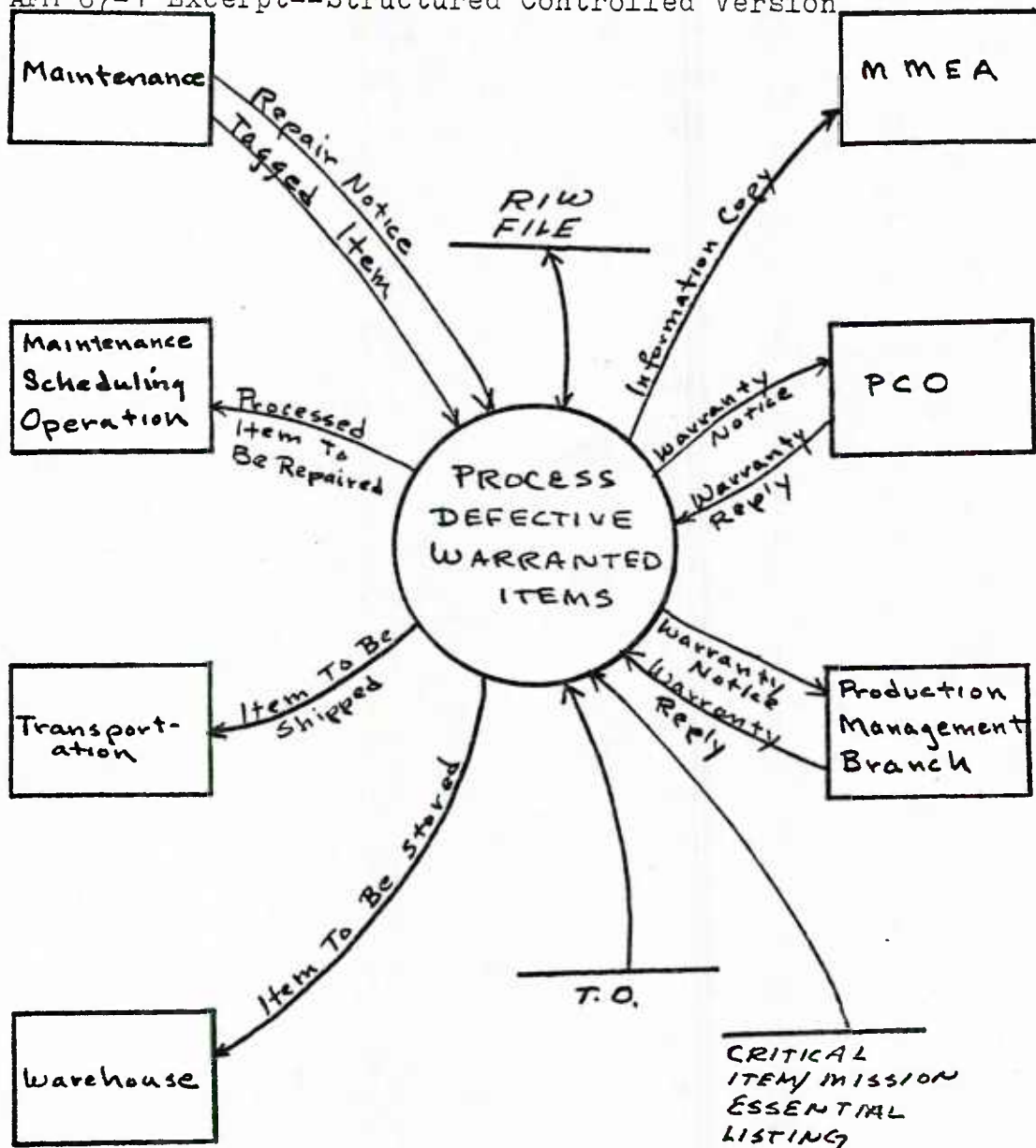
T.O.

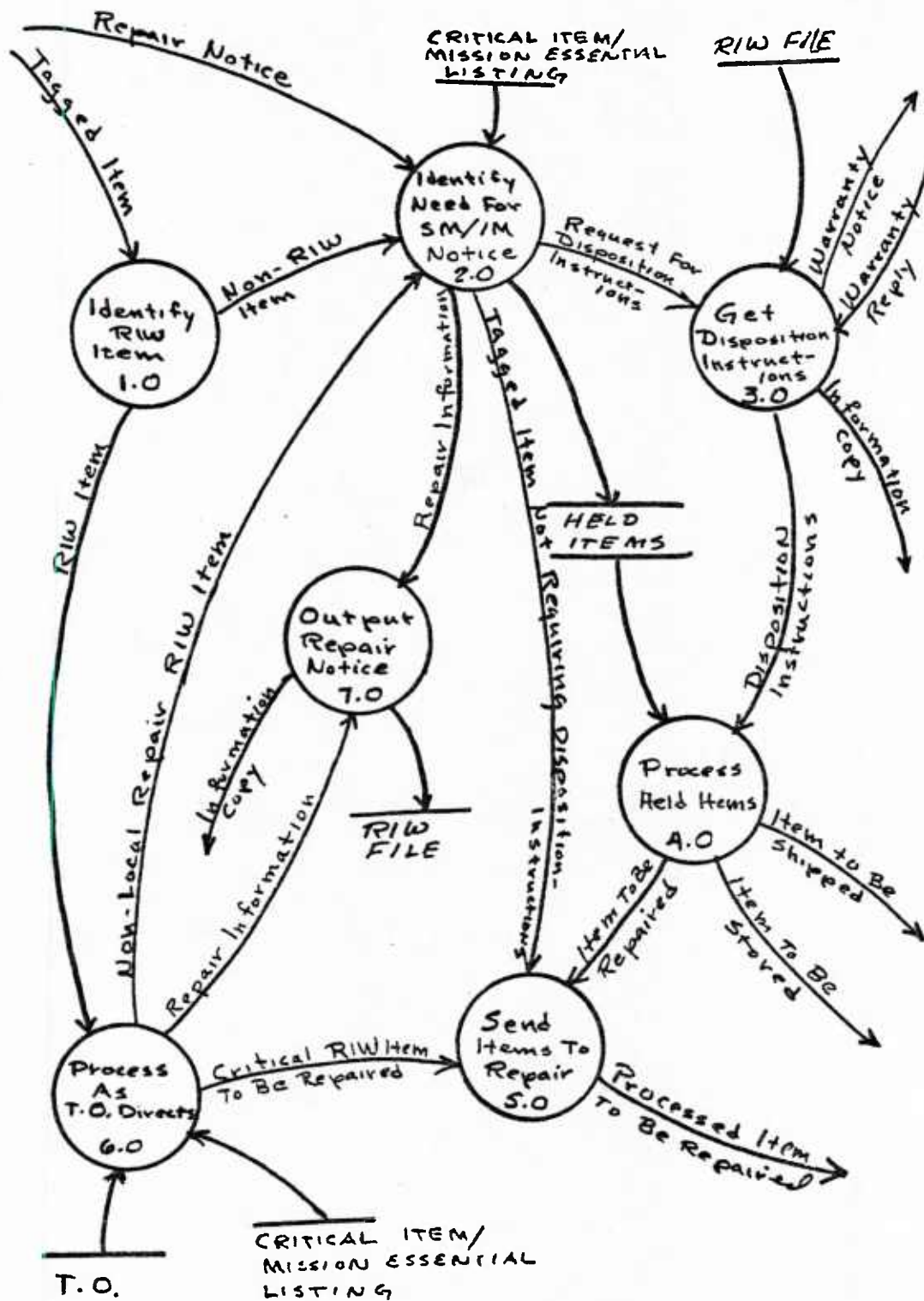
Technical Order for an item

Warranty-Reply

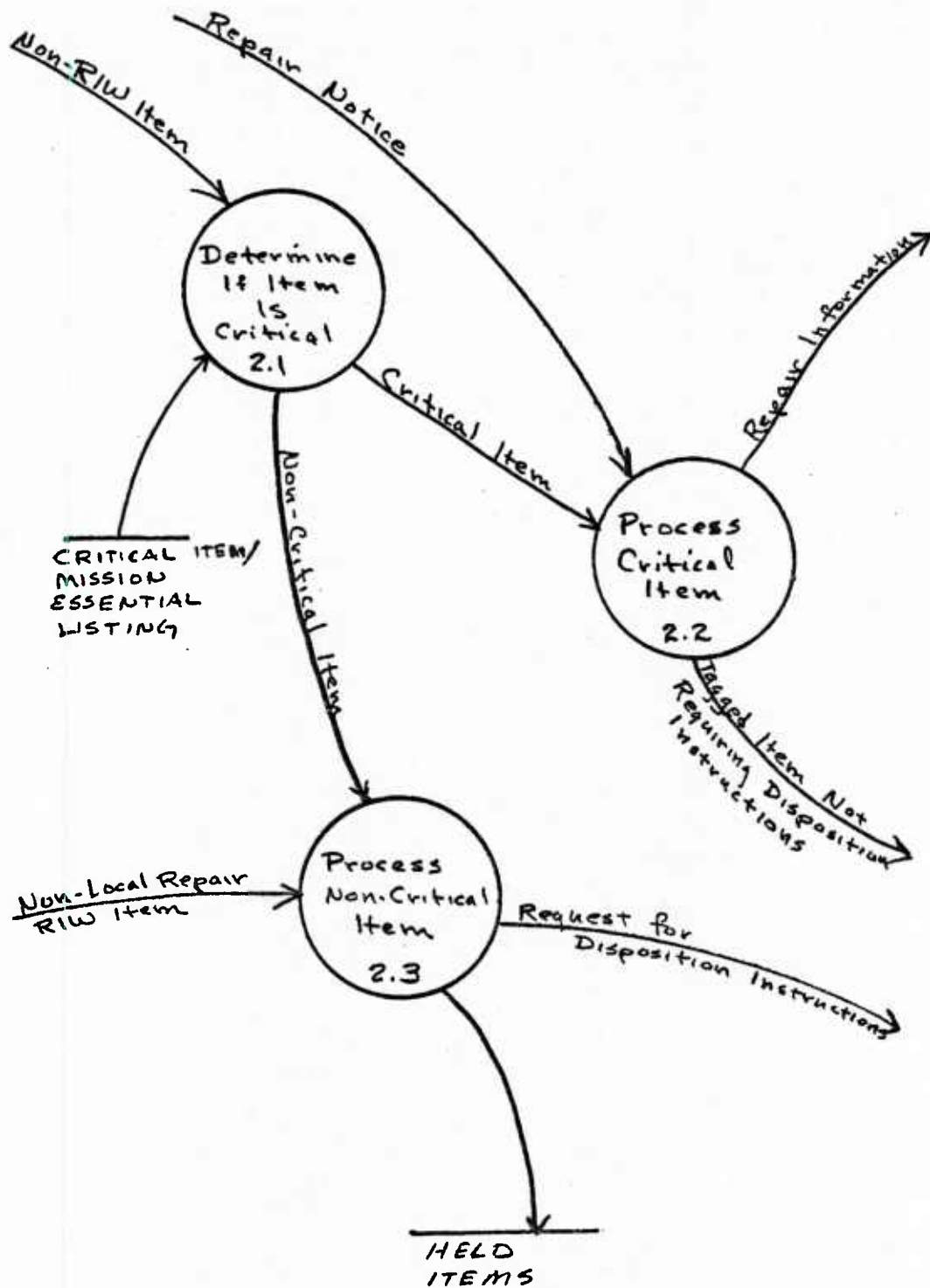
Request for Disposition Instruction plus  
Shipping Instructions or  
Report of Actions Being Taken

AFM 67-1 Excerpt--Structured Controlled Version





- 1.0 For each Tagged-Item you get  
Look at AFTO Form 350 and the item.  
If the AFTO Form 350 or the item identification  
has the words "PACER WARRANT" send out as  
an RIW-Item.  
If not, send it through as a Non-RIW-Item.



- 2.1 For each Non-RIW-Item you get  
Look on Critical-Item/Mission-Essential-Listing  
for the item NSN.  
If on the list, send it through as a Critical-Item.  
If not, send it through as a Non-Critical-Item.



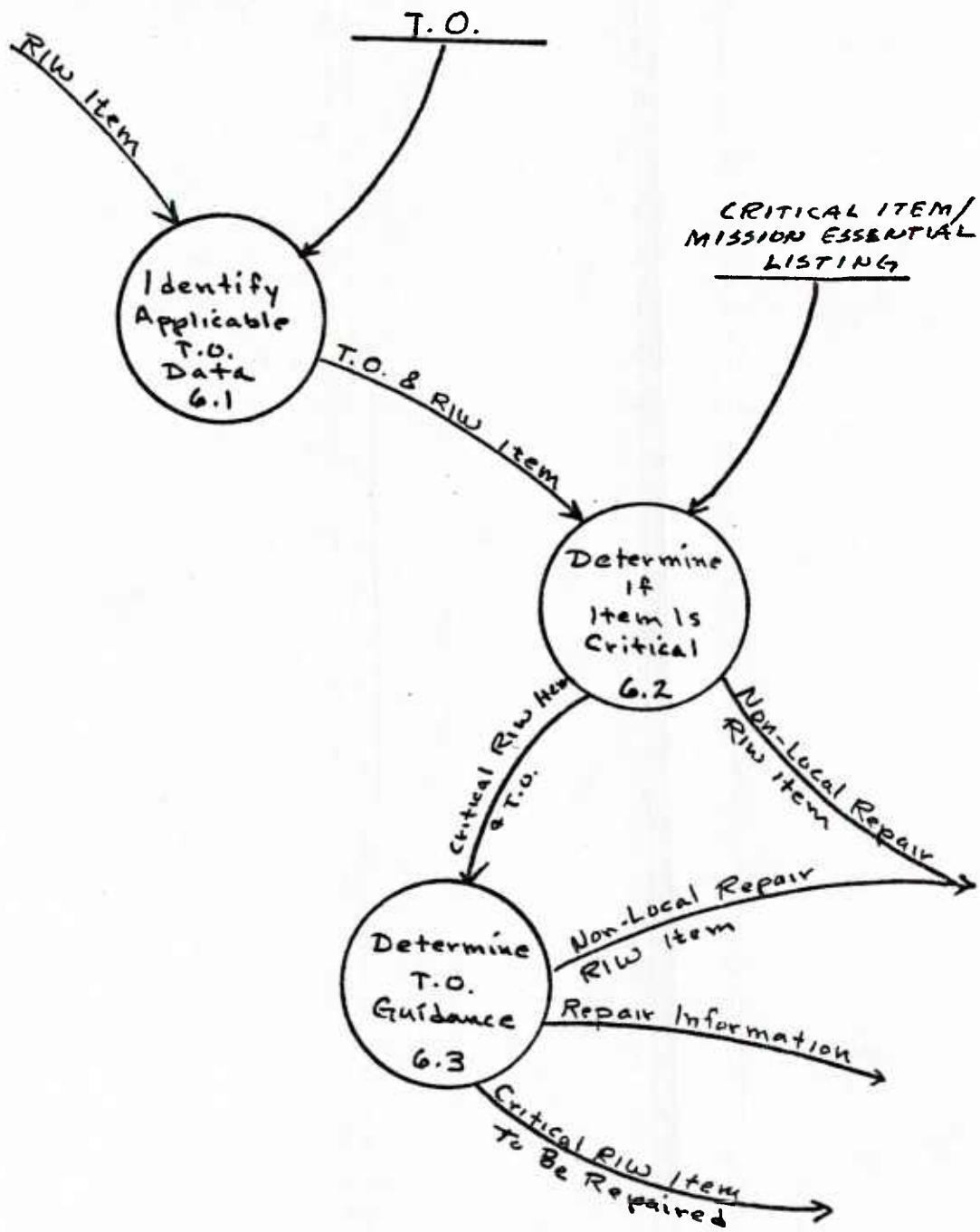
- 2.2 For each Critical-Item you get
1. Find place to send item (the SM/IM)
  2. Send Repair-Information to the SM/IM
  3. Send the item through as a Tagged-Item-Not-  
Requiring-Disposition-Instructions.
- For each Repair-Notice you get from Maintenance
1. Find place to send item (the SM/IM)
  2. Send Repair-Information to the SM/IM

- 2.3. For each Non-Critical-Item or Non-Local-Repair-RIW-Item you get
1. Find place to send item (the SM/IM)
  2. Send Request-for-Disposition-Instructions to SM/IM
  3. Fasten finished DD Form 1575 "Suspended Tag-Material" or 1575-1 "Suspended Label-Material" to the item or package
  4. Put in Held-Item storage place.

- 3.0 For each Request-For-Disposition-Instructions you get
1. Find out what the conditions of the contract/  
warranty are  
If warrant to be used - find the person who made  
the purchase.  
If SM/IM ALC, send Warranty-Notice to the  
SM-ALC PCO.  
If not, send Warranty-Notice to PALM  
(Production Management Branch)  
If not, give Disposition-Instructions to the  
Source of the Request.
  2. Send Information-Copy to MMEA.
- For each Warranty-Reply you get  
Send Disposition-Instructions to the Source of the  
Request.

- 4.0 For each Disposition-Instruction you get
1. Get RIW-Item from Held-Items
  2. If Disposition-Instructions has a Repair Authorization send Item-To-Be-Repaired.  
If not  
If Disposition-Instruction has Shipping Instructions send Item-To-Be-Shipped.  
If not, (Disposition Instructions contains Storage Instructions and Report of Action Being Taken) send Item-To-Be-Stored.

5.0 For each Critical-RIW-Item-To-Be-Repaired and each Tagged-Item-Not-Requiring-Disposition-Instructions and each Item-To-Be-Repaired that you get, send as a Processed-Item-To-Be-Repaired to the maintenance scheduling operation.



6.1 For each RIW-Item you get  
Get the correct T.O. and Section of T.O. 00-35D-54.  
Send T.O. and RIW-Item.

- 6.2 For each T.O. and RIW-Item you get  
Look on Critical-Item/Mission-Essential-Listing  
for the item NSN.  
If on the list, send Critical-RIW-Item and T.O.(s).  
If not, send Non-Local-Repair-RIW-Item with any  
special instructions from T.O. on AFTO Form 350  
on the item.



- 6.3 For each Critical-RIW-Item and T.O.(s) you get  
Find if special instructions/restrictions are on  
the list in the T.O.  
If found and they will not let the repair be done  
here, send Non-Local-Repair-RIW-Item with any  
special instructions from T.O. on AFTO Form  
350 on the item.  
If not:
1. Send Critical-RIW-Item-To-Be-Repaired with  
the words "Critical-Repair-Item/Local Repair  
Authorized" on AFTO Form 350 on the item.
  2. Find place to send item (the SM/IM).
  3. Send Repair-Information to the SM/IM.

7.0 For each Repair-Information you get, the SM/IM will make any new changes in the RIW-File (Past Action History) for that item and send an Information-Copy of the Repair-Information to MMEA.

## DICTIONARY

### Critical-Item

Defective Item  
Critical Item Identification

### Critical-Item/Mission Essential-Listing

NSN plus  
Critical Identification or  
Mission Essential Identification

### Critical-RIW-Item

RIW Item plus  
Critical Item Identification

### Critical-RIW-Item-To-Be-Repaired

Critical Item plus  
Local Repair Authorization Marking (on AFTO Form 350)

### Disposition-Instruction

Item Identification plus  
Repair Authorization or  
Shipping Instructions or  
Storage Instructions and  
Report of Action Being Taken

### Held-Items (N)

RIW Items Awaiting  
Disposition Instructions plus  
Assigned Temporary Location

### Information-Copy

Self Defining

DICTIONARY CONTINUED

Item-To-Be-Repaired

RIW Item plus  
Repair Authorization

Item-To-Be-Shipped

RIW Item plus  
Shipping Instructions

Item-To-Be-Stored

RIW Item plus  
Storage Instructions

Non-Local-Repair-RIW-Item

RIW Item plus either  
non-Critical Item Statement or  
T.O. Section forbidding local repair

Processed-Item-To-Be-Repaired

Tagged Item, or  
Critical RIW Item, or  
Item to be Repaired

Repair-Information

NSN plus  
Critical Item Statement plus  
Report of Action Taken plus  
ID of organization taking action plus  
Date

Repair-Notice

NSN plus  
Report of Action Taken

Request-for-Disposition-Instruction

Source of Request plus  
Date of Request plus

DICTIONARY CONTINUED

Request-for-Disposition-Instruction (Continued)

Item Identification plus  
Defect Information (as available) plus  
Warranty Information (if available)

RIW-File

Item Identification plus  
Contract/Warranty Terms plus  
Buyer Identification plus  
Past Action History

RIW-Item

Tagged Item plus  
Reliability Improvement Warranty I.D.

(SM/IM-ALC)-Warranty Notice

Request for Disposition Instructions plus  
Warranty Information plus  
Statement of intent to exercise plus  
Reply Required Date

Tagged-Item

Defective Item plus  
AFTO Form 350

Tagged-Item-Not-Requiring-Disposition-Instruction

Self Defining

T.O.

Technical Order for an item

Warranty-Reply

Request for Disposition Instruction plus  
Shipping Instructions or  
Report of Actions Being Taken

F-5 T.O.--Narrative Version  
REMOVE AND INSTALL AILERON TRIM ACTUATOR

Special Tools and Test Equipment: None

Supplies:

- Electrical splice, PN NAS 1388-1 (two required)
- Electrical terminal, PN M7928/1-15 (one required)
- Cotter pin, PN MS24665-69 (two required)

Personnel Required: Three

Airplane general mechanic will be required to perform this general procedure.

Airplane general mechanic assistant will be required to position control stick.

Electrical specialist will be required to disconnect and connect trim actuator wiring.

INPUT CONDITIONS

Equipment Conditions:

WARNING

- Prior to accomplishing this maintenance procedure on an armed aircraft, refer to T.O. 1F-5E-2-12 for precautions to be observed. Failure to observe this warning may result in serious injury to personnel or damage to the aircraft.
- When movement of any controls or switches or the application of electrical power and/or hydraulic pressure would endanger personnel or equipment, a warning placard will be placed conspicuously on the aircraft. (See T.O. 1F-5E-2-12 for recommended placard design.)
- All electrical power shall remain off during this procedure.
- Both hydraulic systems shall remain depressurized during this procedure.

### Remove Actuator

1. Remove aileron control mechanism access door (6).

#### WARNING

Severe injury could result if control stick is moved inadvertently during this procedure.

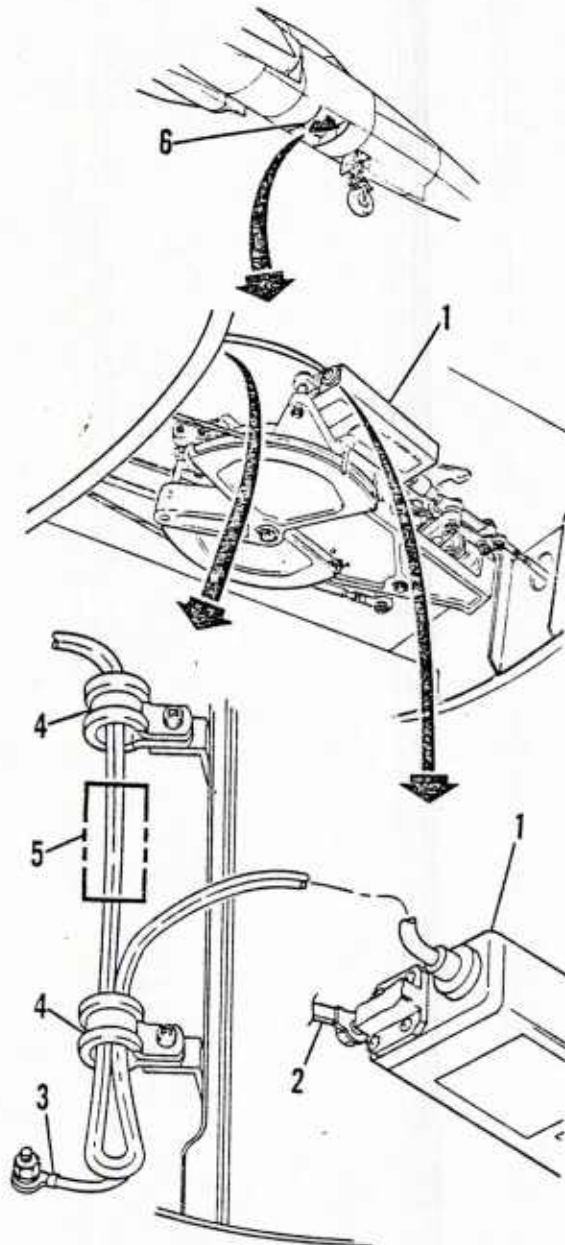
#### CAUTION

Loose ends of aircraft wiring shall be taped if not properly spliced.

#### Note

- . Retain all removed hardware for reinstallation. Do not retain cotter pins for reinstallation.
  - . Electrical specialist shall perform steps 2 thru 5.
2. Remove clamps (4), two places, securing actuator wires to bulkhead.
  3. Disconnect trim actuator wires (two) at splice area (5).
  4. Disconnect actuator ground wire C from ground stud (3).
  5. Disconnect bonding jumper (2) from actuator (1).

T.O. 1F-5E-2-2-5-1



VIEW LOOKING AFT

F-5 JG-2-5-162(1)A

Change 7

9-5

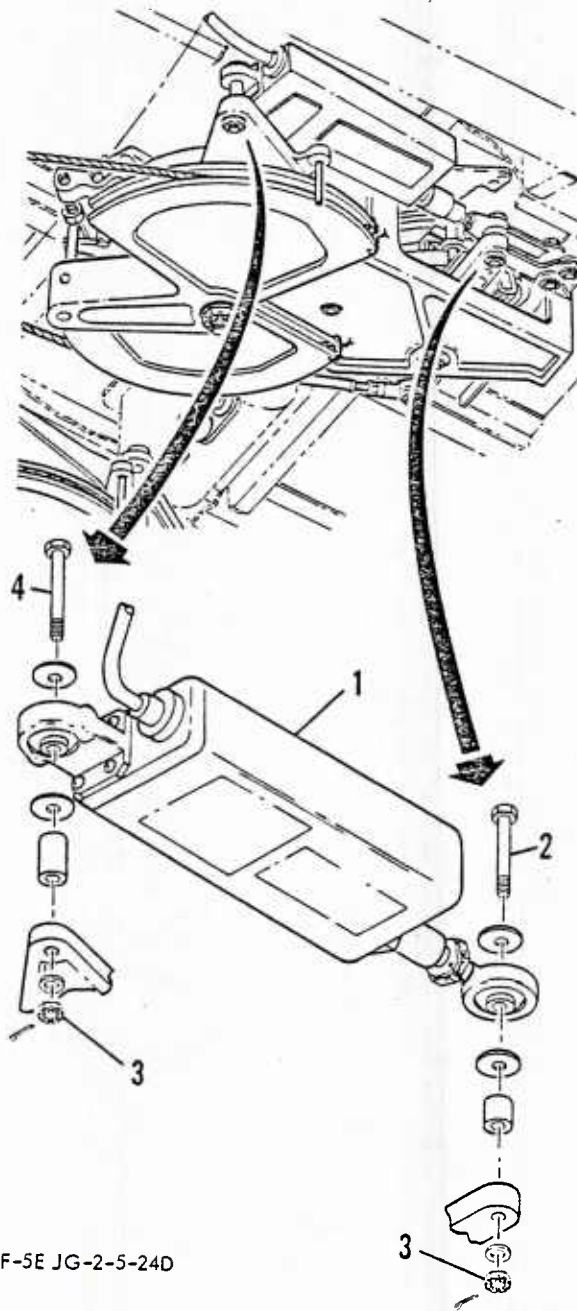


### Remove Actuator

1. Remove cotter pin, nut (3), and washer, two places.
2. If trim actuator (1) is in any position other than neutral, request assistant position control stick to ease attach bolt removal.
3. Remove attach bolt (2), washers, and spacer.
4. While holding actuator, remove attach bolt (4), washers, and spacer, and remove actuator from aircraft.

END OF REMOVE

T.O. 1F-5E-2-2-5-1



F-5E JG-2-5-24D

9-7

### Install Actuator

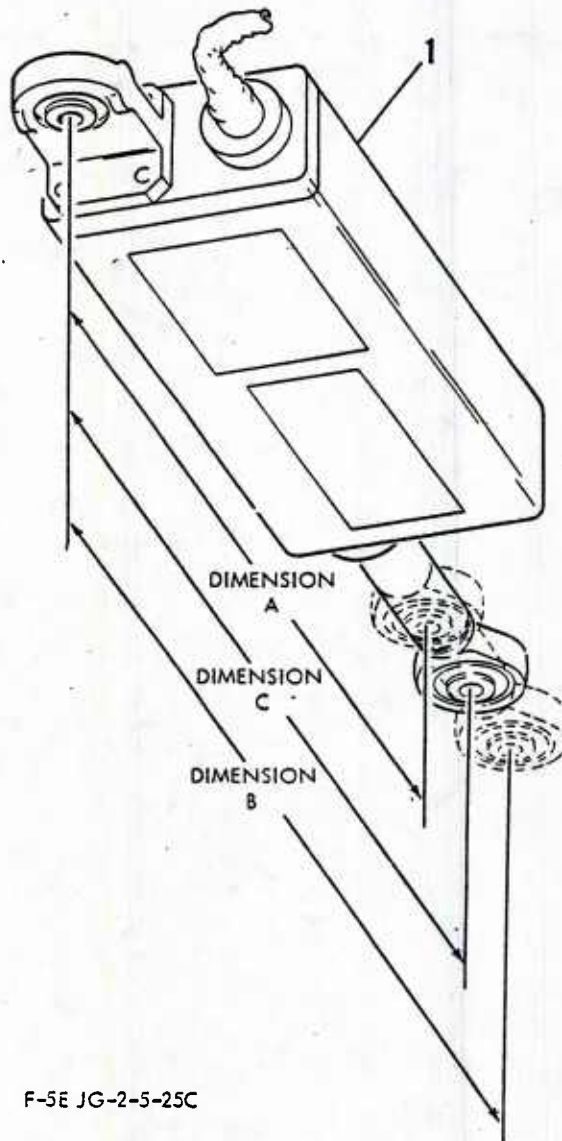
1. Request electrical specialist connect power source (115-volt, 400 Hz) to trim actuator (1) and electrically position actuator at fully retracted and extended positions.

#### NOTE

Retracted position should measure  $7.79 \pm 0.05$  inches (dimension A). Extended position should measure  $9.86 \pm 0.05$  inches (dimension B).

2. Electrically position actuator at neutral length  $8.80 \pm 0.10$  inches (dimension C). Disconnect power source.

T.O. 1F-5E-2-2-5-1



9-9

## Install Actuator

### WARNING

Severe injury could result if control stick is moved inadvertently during this procedure.

1. Place trim actuator (4) in position, and install aft attach point washers (10), spacer (9), and bolt (12).

### Note

Perform steps 2 and 3 at same time.

2. Request assistant position control stick as necessary to permit installation of forward attach bolt.
3. Install forward attach bolt (5) with washers (6) and spacer (7).
4. Install washers and nuts (8), two places.
5. Secure nuts (8) with MS24665-69 cotter pins, two places.

### Note

Electrical specialist shall perform steps 6 thru 9.

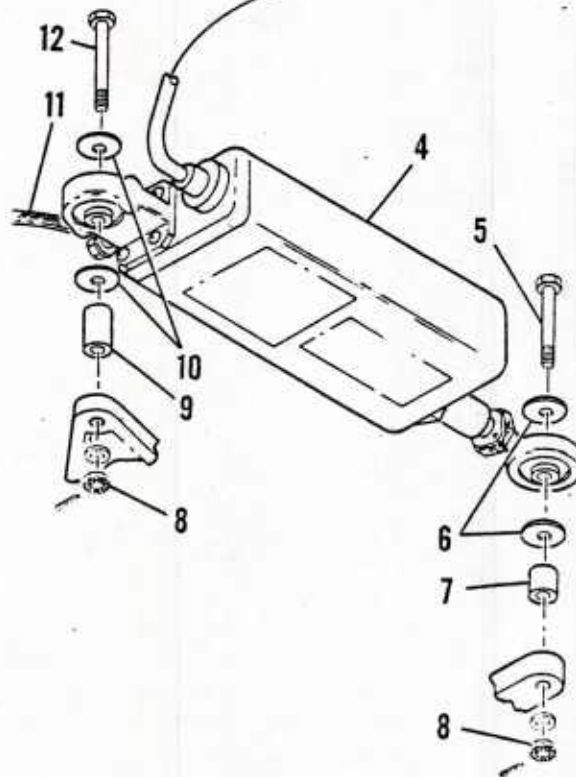
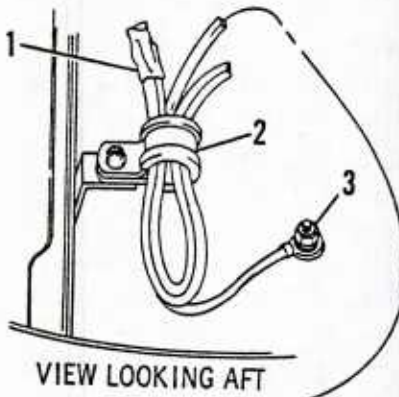
6. At splice area 4B1WT1 (1), splice trim actuator wire B to aircraft wire C2B20. Splice actuator wire A to aircraft wire C3B20.
7. Install terminal on actuator wire C and connect to ground stud (3).
8. Connect bonding jumper (11) to actuator (4).
9. Install clamps (2), two places, with actuator wires to bulkhead.

### CAUTION

Follow-on maintenance action required:  
Perform operational checkout of aileron trim system.  
(See section 1 of this T.O.)

END OF SECTION

T.O. 1F-5E-2-2-5-1



F-5E JG-2-5-26D

GPO 683-210/1005

9-11/(9-12 blank)

## F-5 T.O.--Controlled Version

### REMOVE AND INSTALL AILERON TRIM ACTUATOR

#### Special Tools and Test Equipment

None

#### Supplies

Electrical splice, PN NAS 1388-1 (2 needed)

Electrical terminal, PN M7928/1-15 (1 needed)

Cotter pin, PN MS24665-69 (2 needed)

#### Personnel Needed

Airplane general mechanic will be needed to do this procedure.

Airplane general mechanic assistant will be needed to move control stick.

Electrical specialist (one who specifically works with electricity) will be needed to disconnect and connect trim actuator wiring.

### INPUT CONDITIONS

#### WARNING

\*Before you do this maintenance procedure on an armed aircraft, see T.O. 1F-5E-2-12 for safety procedures to be followed. Failure to follow this warning will cause a danger to personnel or damage to the aircraft.

\*A warning notice will be put on the aircraft in a place easily seen when there is danger to personnel or equipment by:

1. Movement of any controls or
2. The application of electricity and/or hydraulic pressure.

(See T.O. 1F-5E-2-12 for recommended placard design.)

\*All electricity will be kept off during this procedure.

\*Both hydraulic systems will be kept without pressure during this procedure.

## REMOVE AND INSTALL AILERON TRIM ACTUATOR

### Remove Actuator

1. Remove aileron control mechanism access door (6).

### WARNING

Injury can result if control stick is moved by accident during this procedure.

### CAUTION

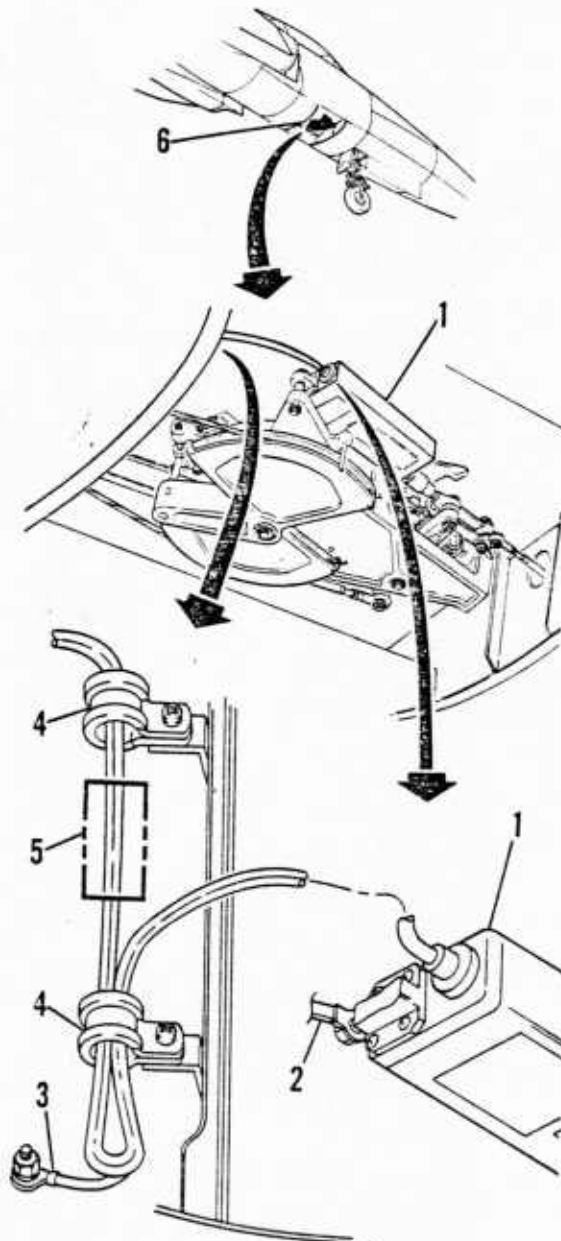
Put tape on loose ends of aircraft wiring if not connected (spliced) correctly.

### NOTE:

- Keep all hardware removed for later assembly. Do not keep cotter pins for later assembly.
  - A person who specifically works with electricity will do steps 2 thru 5.
2. Remove clamps (4) from 2 places. Fasten actuator wires to bulkhead.
  3. Disconnect 2 trim actuator wires at splice area (5).
  4. Remove bolt that holds the actuator ground wire to the ground stud (3). Now, remove the actuator ground wire from the ground stud (3).
  5. Remove bolt that holds the bonding jumper (2) to the actuator (1). Then disconnect bonding jumper (2) from actuator (1).



T.O. 1F-5E-2-2-5-1



VIEW LOOKING AFT

F-5 JG-2-5-162(1)A

Change 7

9-5

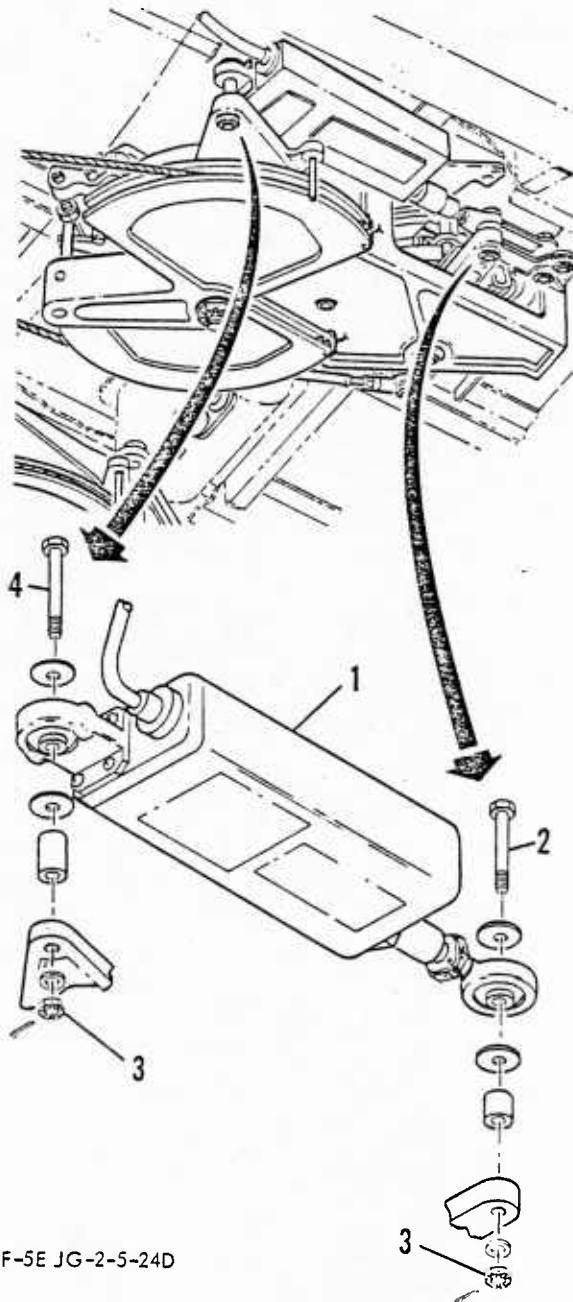
## REMOVE AND INSTALL AILERON TRIM ACTUATOR

### Remove Actuator

1. Remove cotter pin, nut (3), and washer, in 2 places.
2. If trim actuator (1) is in any position other than neutral, tell the general mechanic assistant to carefully move the control stick until attach bolt (2) can be moved easily.
3. Remove attach bolt (2), washers, and spacer.
4. Hold the actuator so it will not fall. Remove the other attach bolt (4), washers, and spacer. Remove the actuator (1) from the aircraft.

END OF REMOVE

T.O. 1F-5E-2-2-5-1



F-5E JG-2-5-24D

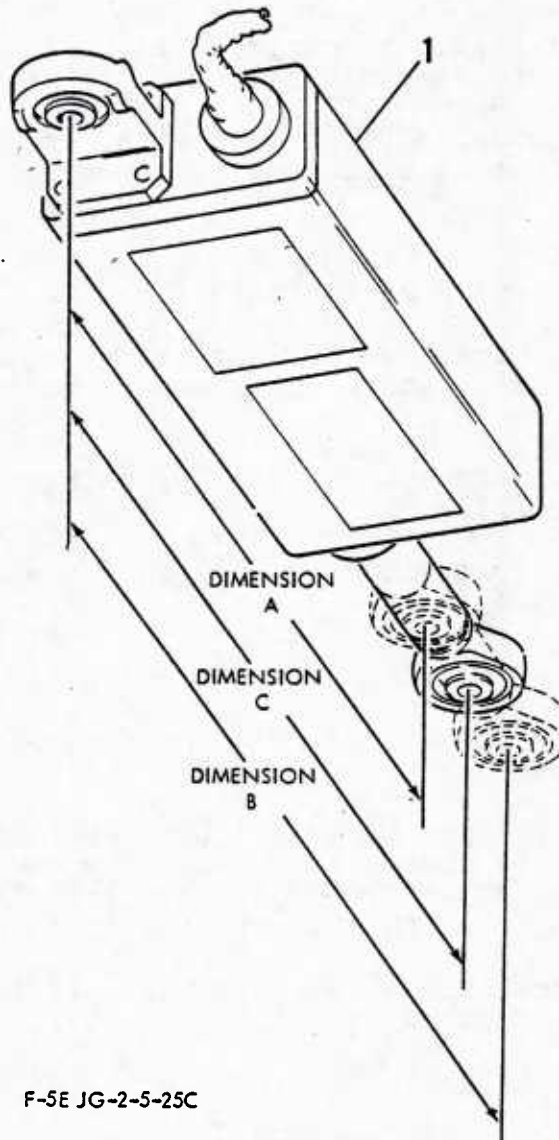
9-7

## REMOVE AND INSTALL AILERON TRIM ACTUATOR

### Install Actuator

1. Tell person who specifically works with electricity to connect power source (115-volt, 400 Hz) to trim actuator (1). Next tell him/her to electrically position actuator at fully retracted position. Measure dimension. Dimension must equal between 7.84 and 7.74 inches (Dimension A). Then tell him/her to electrically position actuator at fully extended position. Measure dimension. Dimension must equal between 9.91 and 9.81 inches (Dimension B).
2. Electrically position actuator at neutral length between 8.90 and 8.70 inches (Dimension C). Disconnect power source.

T.O. 1F-5E-2-2-5-1



9-9

## REMOVE AND INSTALL AILERON TRIM ACTUATOR

### Install Actuator

#### WARNING

Injury can result if control stick is moved by accident during this procedure.

1. Put trim actuator (4) in position, and install rear attach point washers (10), spacer (9), and bolt (12).

#### NOTE:

Do steps 2 and 3 at the same time.

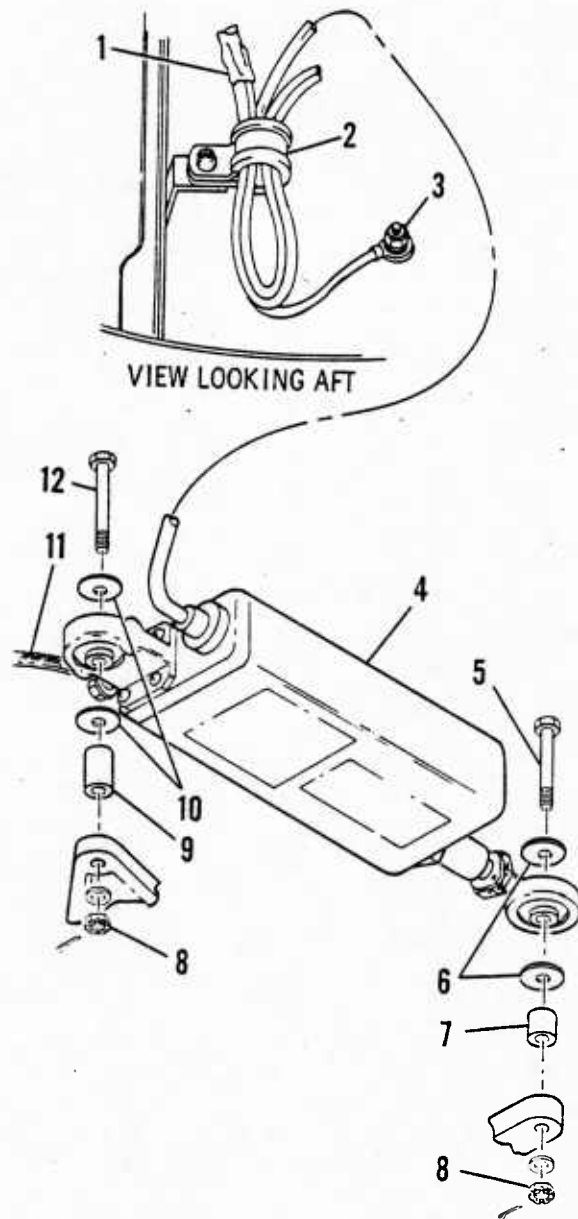
2. Tell the general mechanic assistant to carefully move the control stick until attach bolt can be installed easily.
3. Install forward attach bolt (5) with washers (6) and spacer (7).
4. Install washers and nuts (8), in 2 places.
5. Fasten nuts (8) with MS24665-69 cotter pins, in 2 places.

#### NOTE:

A person who specifically works with electricity will do steps 6 thru 9.

6. At connected area 4B1WT1 (1), connect trim actuator wire B to aircraft wire C2B20 with electrical splice PN NAS 1388-1. Connect actuator wire A to aircraft wire C3B20 with electrical splice PN NAS 1388-1.
7. Install terminal on actuator wire C. Fasten actuator wire to ground stud (3) with nut.
8. Fasten bonding jumper (11) to actuator (4) with nut.
9. Install clamps (2) in 2 places with actuator wires to bulkhead. Fasten clamps to bulkhead with nuts.

T.O. 1F-5E-2-2-5-1



F-5E JG-2-5-26D

GPO 683-210/1005

9-11/(9-12 blank)

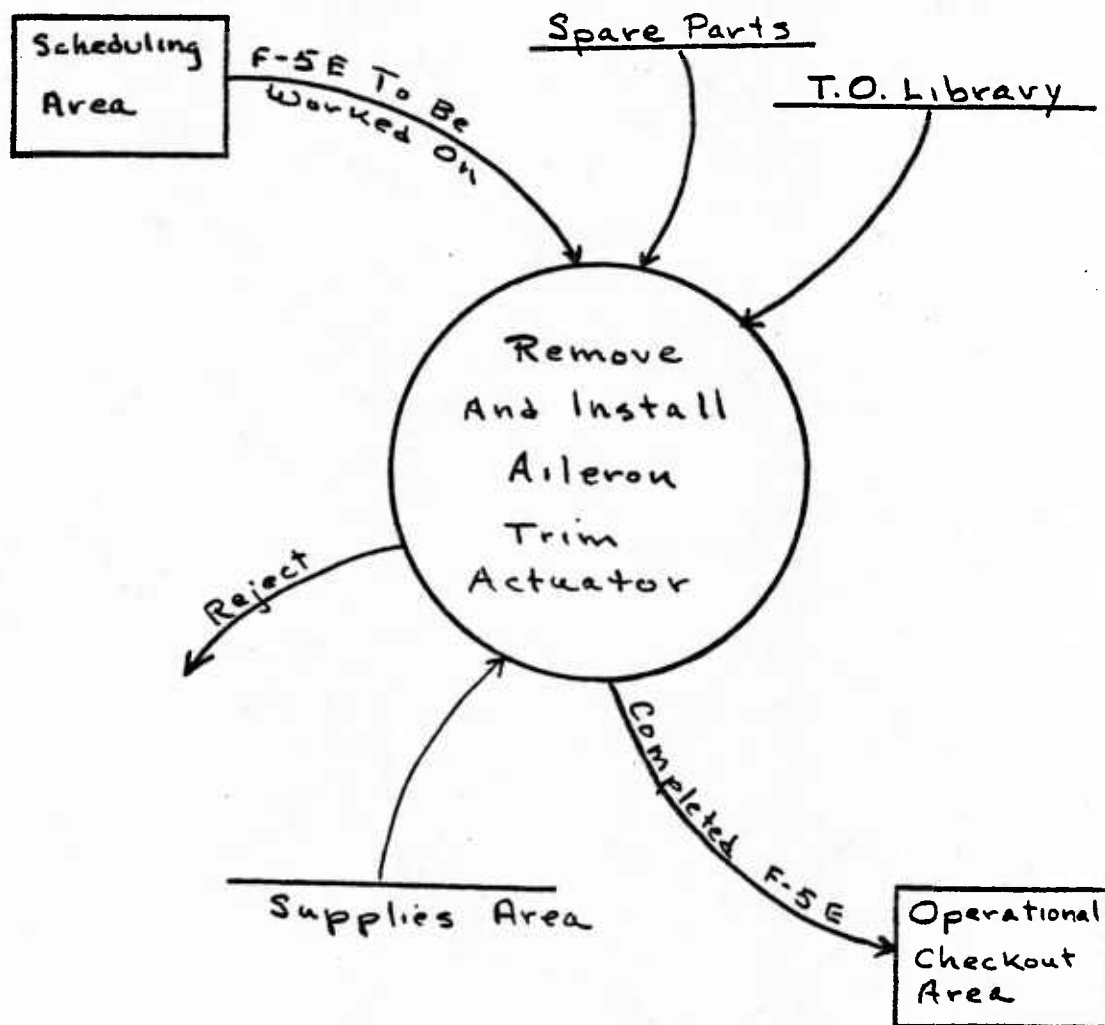
CAUTION:

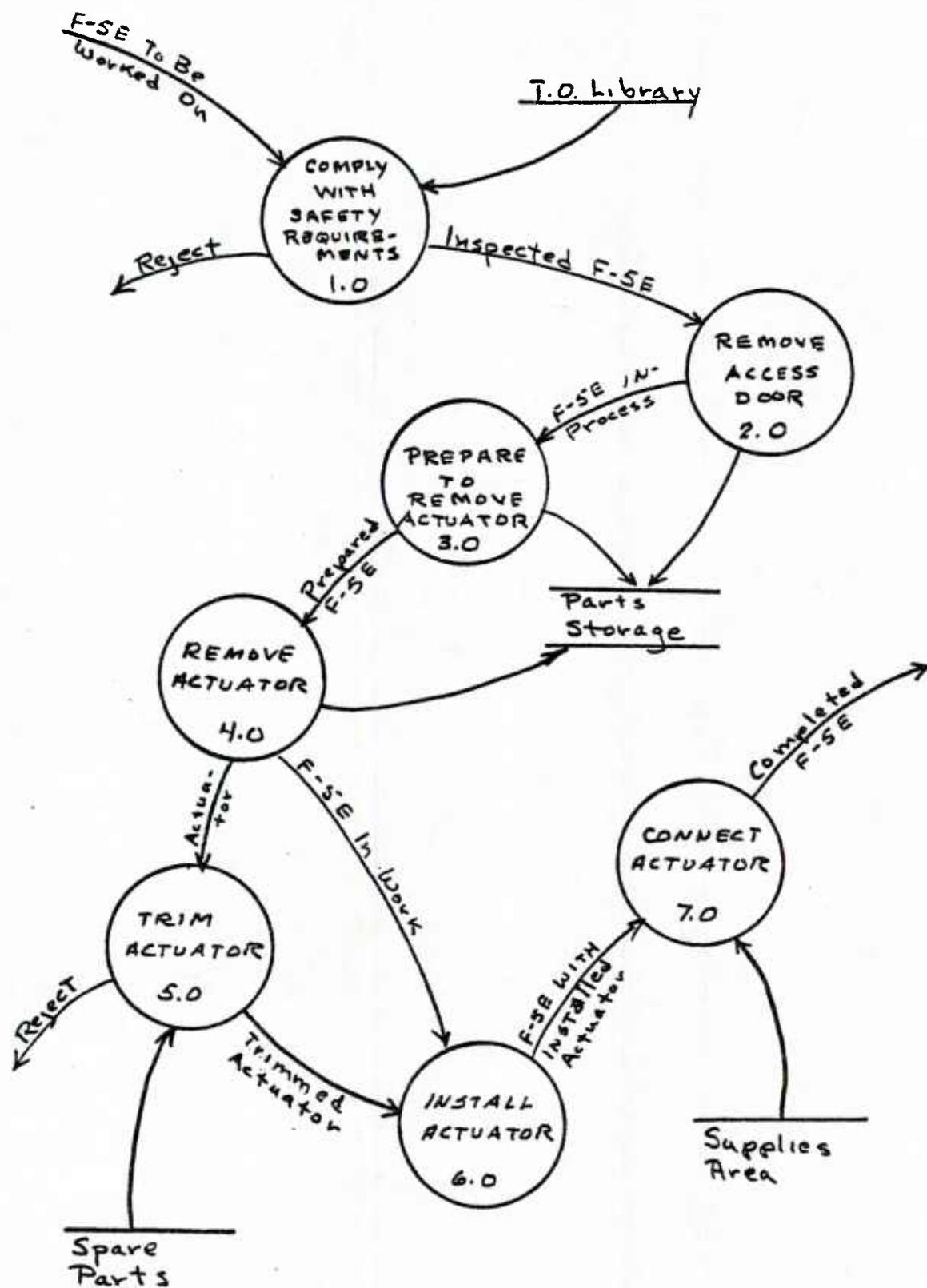
: Before the aircraft can be released the operational check out of the aileron trim system (See section 1 of this T.O.) must be done.

END OF SECTION



F-5 T.O.---Structured Version





1.0 For each F-5E-To-Be-Worked-On that is received, the  
Airplane general mechanic will:  
Turn off all electrical power in/to the aircraft.  
Leave off for entire procedure.  
Determine if all hydraulic systems are depressurized.  
If not, reject aircraft back to scheduling for  
depressurization.  
Else, proceed to next step.  
Obtain T.O. IF-5E-2-12 from T.O.-Library.  
Identify all safety precautions to be followed.  
Comply with precautions of T.O.  
(Do not continue this procedure until all pre-  
cautions have been complied with.)  
Place warning placards on the aircraft (placard  
design IAW T.O. IF-5E-2-12).  
Output Inspected-F-5E.

2.0 For each Inspected-F-5E, the Airplane general mechanic will:

Direct assistant to be sure no one moves the control stick during this procedure (except as directed during the Remove Actuator process and Install Actuator processes).

Remove the aileron control mechanism access door (See Figure 1)

Keep the bolts and door for reinstallation by placing them in Parts-Storage.

Output F-5E-In-Process.

T.O. 1F-5E-2-2-5-1

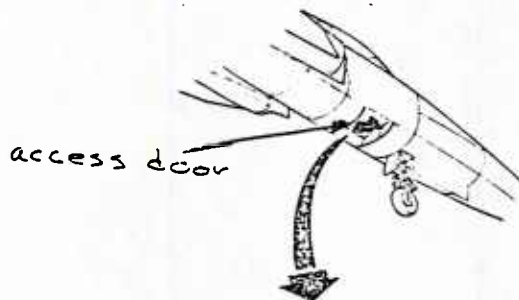


Figure 1

- 3.0 For each F-5E-In-Process the Electrical Specialist will (See Figure 2)
- Remove clamps in two places, as shown. Secure actuator wires to bulkhead with tape. Place clamps in Parts-Storage.
  - Disconnect the two trim actuator wires at the splice area. Tape loose ends of wire.
  - Disconnect actuator ground wire, C, from ground stud. Strip terminal from wire. Discard terminal. Tape end of exposed wire.
  - Disconnect bonding jumper from Actuator. Place nut in Parts-Storage.
- Output Prepared-F-5E.

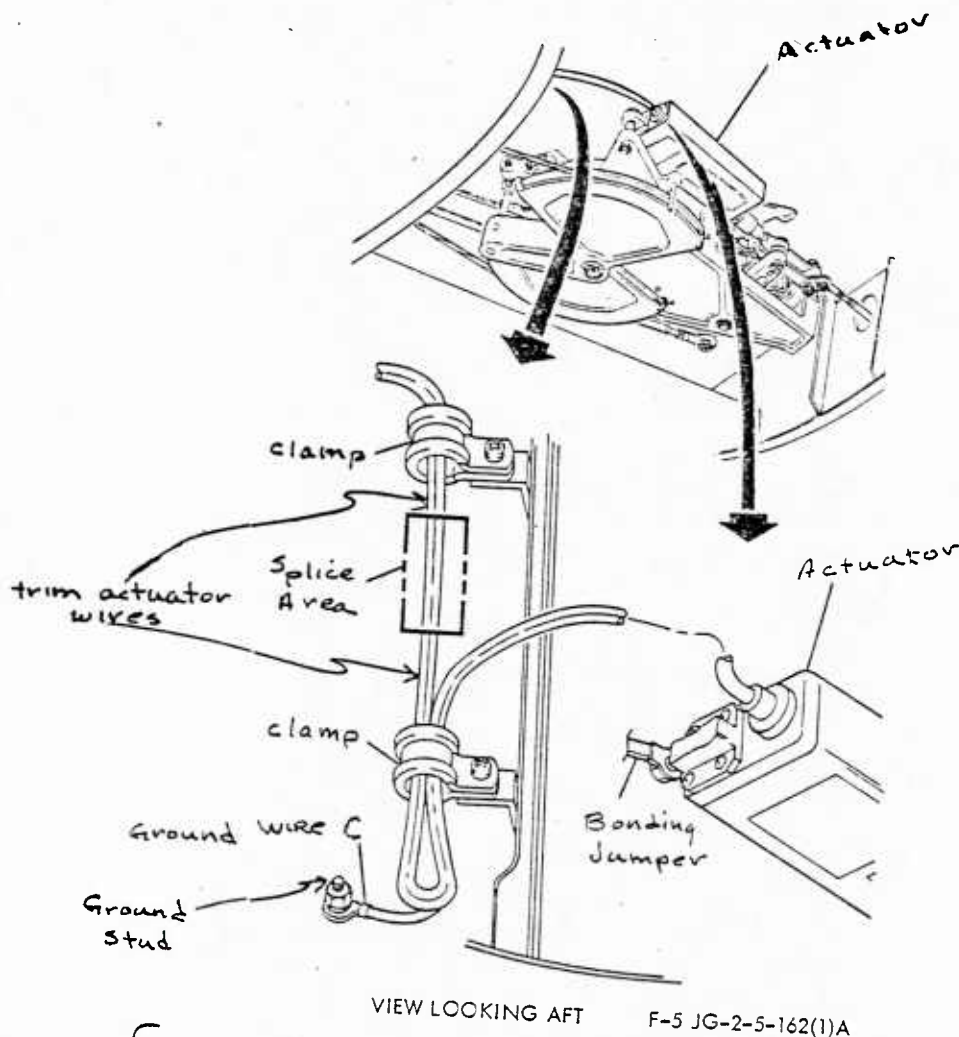


Figure 2

VIEW LOOKING AFT

F-5 JG-2-5-162(1)A

Change 7

9-5

4.0 For each Prepared-F-5E, the Airplane general mechanic will (See Figure 3)  
Remove cotter pins from bolts and discard.  
Remove nut and washer from attach bolt, place nuts and washers in Parts-Storage.  
Determine if Trim Actuator is in neutral position.  
If not, direct assistant to move control stick to neutral position, then continue.  
Else, (already in neutral) continue.  
Hold Actuator and  
Remove the attach bolts, washers and spacers, one bolt at a time.  
Place bolts, washers and spacers in Parts-Storage.  
Remove Actuator from the aircraft.  
Output Actuator.  
Output F-5E-In-Work.

T.O. 1F-5E-2-2-5-1

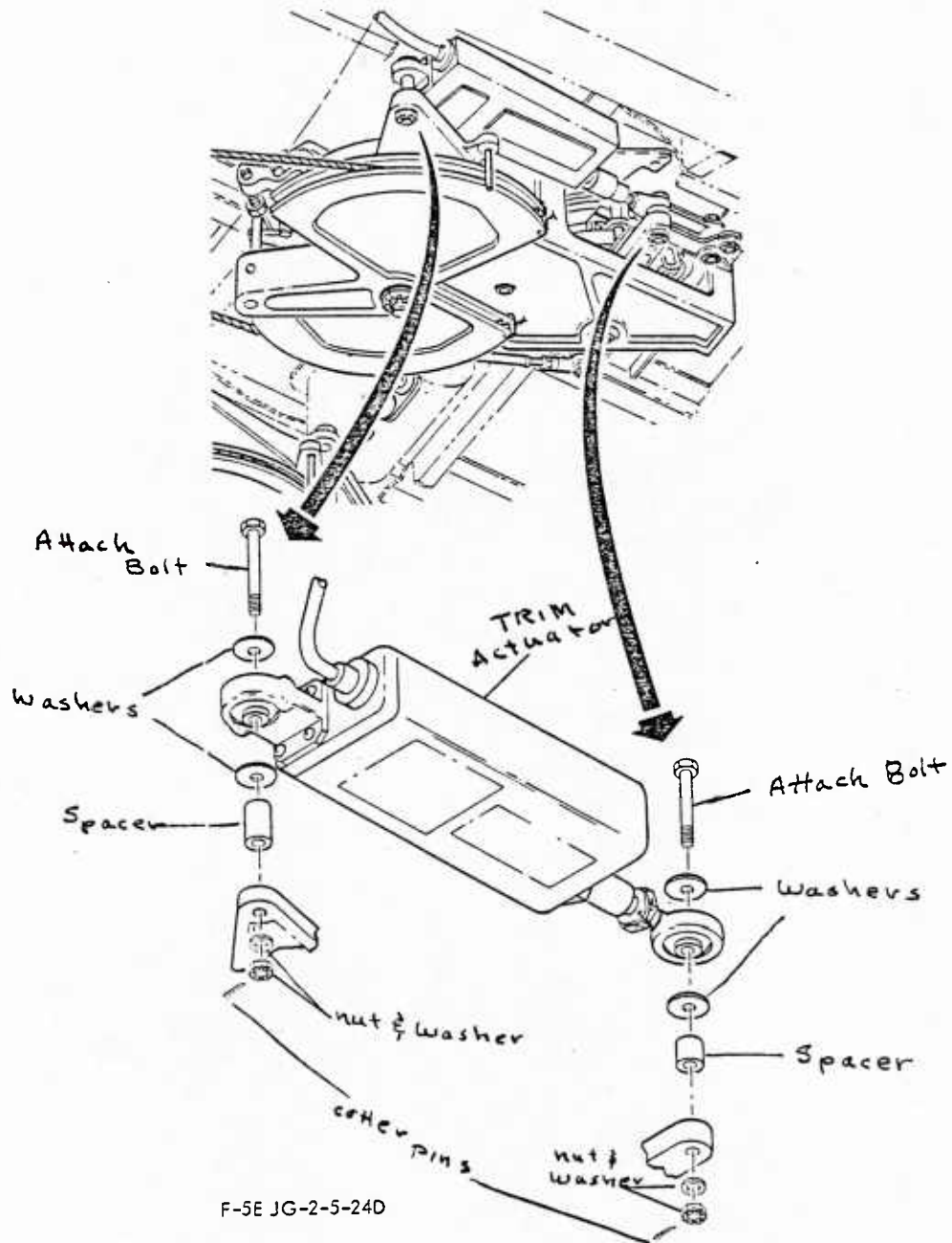
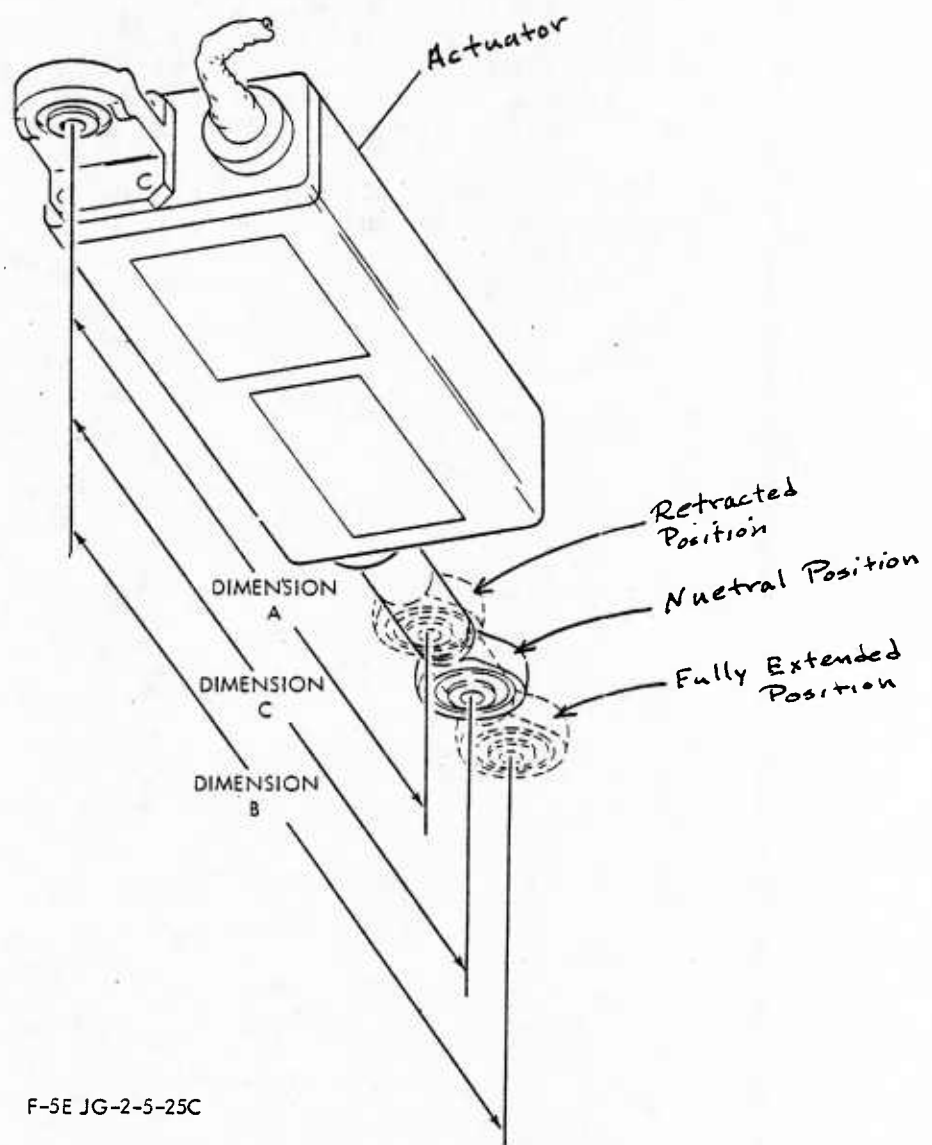


Figure 3

5.0 For each Actuator received, the electrical specialist shall (See Figure 4)  
Connect 115 volt, 400 Hz power source to trim Actuator.  
Electrically position actuator at fully retracted position.  
Measure for correct adjustment (should = dimension A) 7.79 inches  $\pm$  0.05 inches.  
If within tolerances, continue.  
Else, reject Actuator and obtain a new Actuator from Spare-Parts and begin this process again.  
Electrically position Actuator at fully extended position.  
Measure for correct adjustment (Should = Dimension B, 9.86 inches  $\pm$  .05 inches).  
If within tolerances, continue.  
Else, reject Actuator and obtain a new Actuator from Spare-Parts and begin this process again.  
Electrically position Actuator at neutral position.  
Measure for correct adjustment (should = Dimension C, 8.80 inches  $\pm$  0.10 inches).  
If within tolerances, continue.  
Else, reject Actuator and obtain a new Actuator from Spare-Parts and begin this process again.  
Disconnect power source.  
Output Trimmed-Actuator.



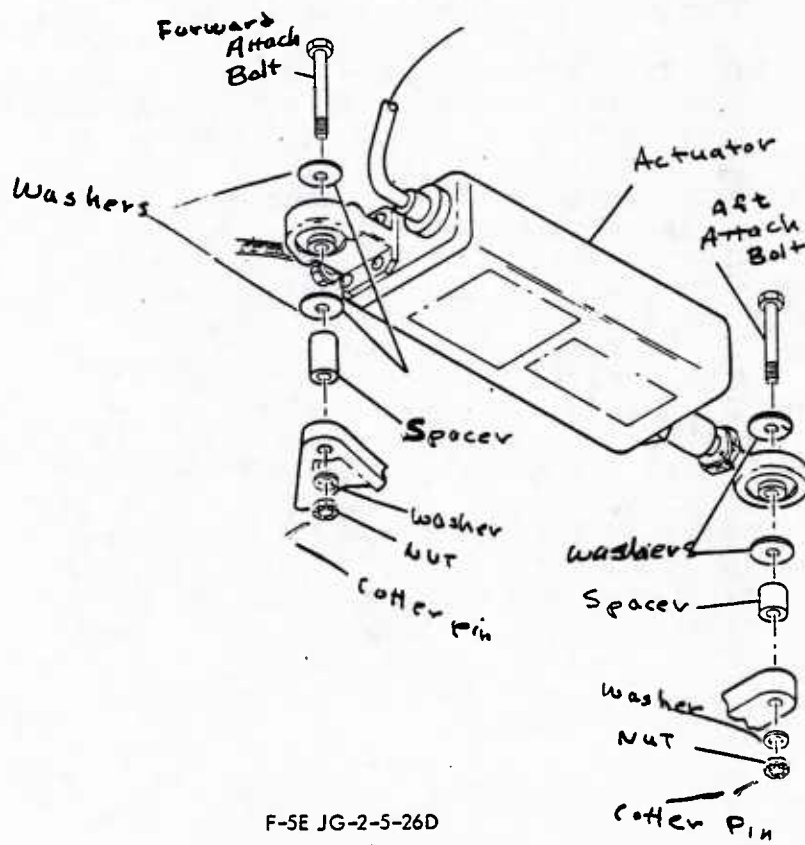
T.O. 1F-5E-2-2-5-1



F-5E JG-2-5-25C

Figure 4

6.0 For each F-5E-In-Work and Trimmed-Actuator received, an Airplane general mechanic shall (See Figure 5)  
Obtain attach bolts, spacers and washers from Parts-Storage.  
Obtain two MS24665-69 Cotter Pins from Supplies-Area.  
Place Actuator in proper position and install.  
Attach bolt to rear of Actuator with washers, spacer and bolt, as shown in Figure 5.  
Direct assistant to position/move control stick, as required, to allow attachment of forward attach bolt.  
When positioned, install forward attach bolt with washers, spacer and bolt, as shown in Figure 5.  
Install lower washers and nuts, as shown in Figure 5.  
Secure both nuts with cotter pins (one for each nut).  
Output F-5E-with-Installed-Actuator.



F-5E JG-2-5-26D

GPO 683-210/1005

Figure 5

7.0 For each F-5E-With-Installed-Actuator the Electrical Specialist will (See Figure 6)  
Obtain Electrical Splices (two), PN NAS 1388-1 and Electrical Terminal, PN M7928/1-15 (one) from Supplies-Area.  
Obtain Ground Stud Nut, bonding jumper nut, clamps and clamp nuts from Parts-Storage.  
Identify wires.  
With Electrical Splices, at Splice Area 4B1WT1, Splice trim Actuator wire B to aircraft wire C2B20 and Actuator wire A to aircraft wire C3B20.  
Remove tape from Actuator wire C.  
Install Electrical Terminal, PN M7928/1-15 on the actuator wire.  
Connect to Ground Stud with nut from Parts-Storage.  
Connect bonding jumper to Actuator with bonding jumper nut from Parts-Storage.  
Fasten Actuator wires to bulkhead with clamps (2) and clamp nuts obtained from Parts-Storage.  
The Airplane general mechanic will obtain  
Obtain the Access Door and installation bolts from Parts-Storage.  
Install the Access Door with the installation bolts.  
Check that all the above steps have been completed.  
Output Completed-F-5E to Operational Checkout Area.  
Notice: The aircraft may not be released from maintenance without being processed through the Operational Checkout Area.

T.O. 1F-5E-2-2-5-1

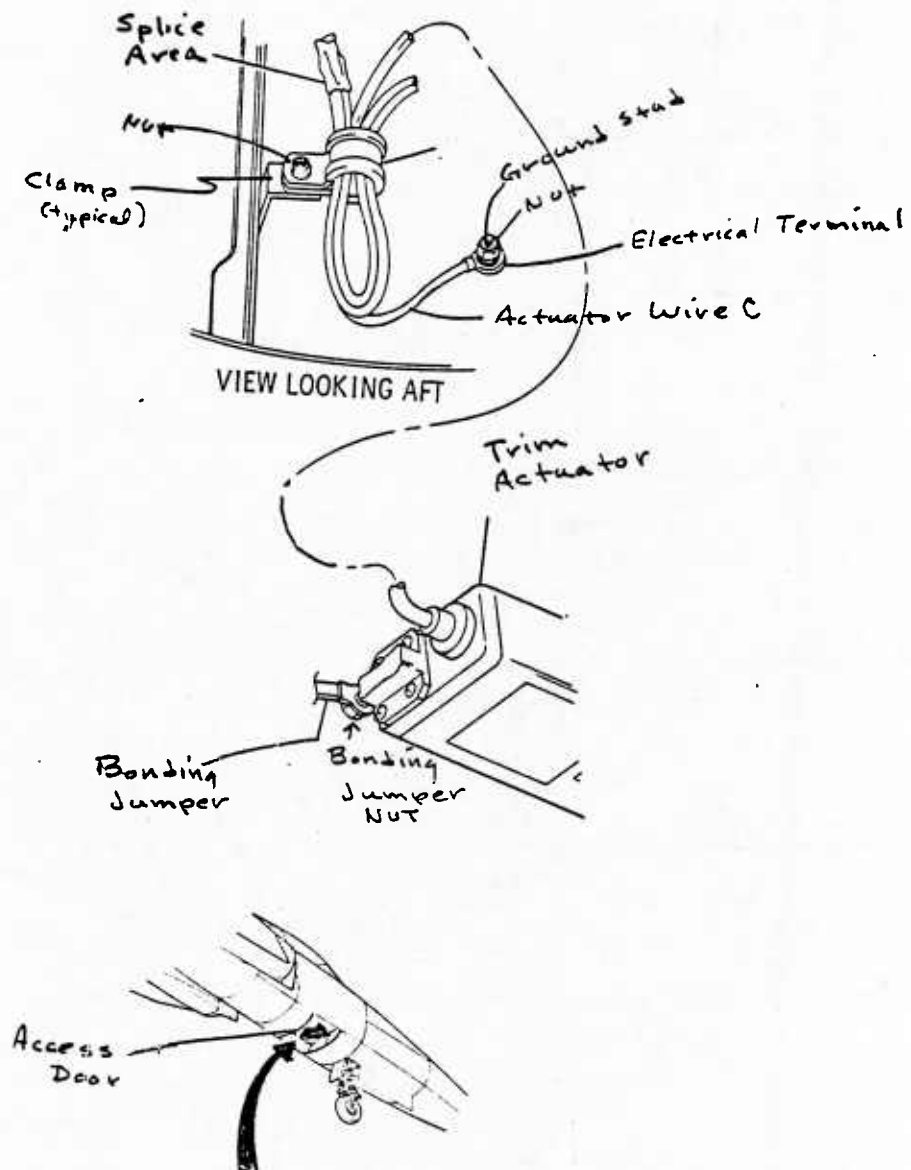


Figure 6

## DICTIONARY

### Actuator

F-5E Actuator

### Aileron-Trim-Actuator

Aircraft Part, self defining

### Completed-F-5E

F-5E with Installed Actuator plus  
Access Door

### F-5E-In-Process

F-5E to be worked on minus  
Access Door and Bolts

### F-5E-In-Work

F-5E in Process minus  
Actuator

### F-5E-To-Be-Worked-On

Self Defining

### F-5E-With-Installed-Actuator

F-5E in work plus  
Trimmed Actuator

### Inspected F-5E

F-5E to be worked on plus  
Necessary placards

## DICTIONARY CONT'D

### Parts-Storage

(Any Temporary Storage for parts removed from the F-5E in this procedure. Parts will be used to reinstall equipment.)

Clamps plus  
Nuts plus  
Washers plus  
Spacers  
Access Door

### Prepared-F-5E

Self Defining

### Spare-Parts

New Actuator

### Supplies-Area

Electrical splice, PN NAS 1388-1 plus  
Electrical terminal, PN M7928/1-15 plus  
Cotter Pin, PN MS24665-69

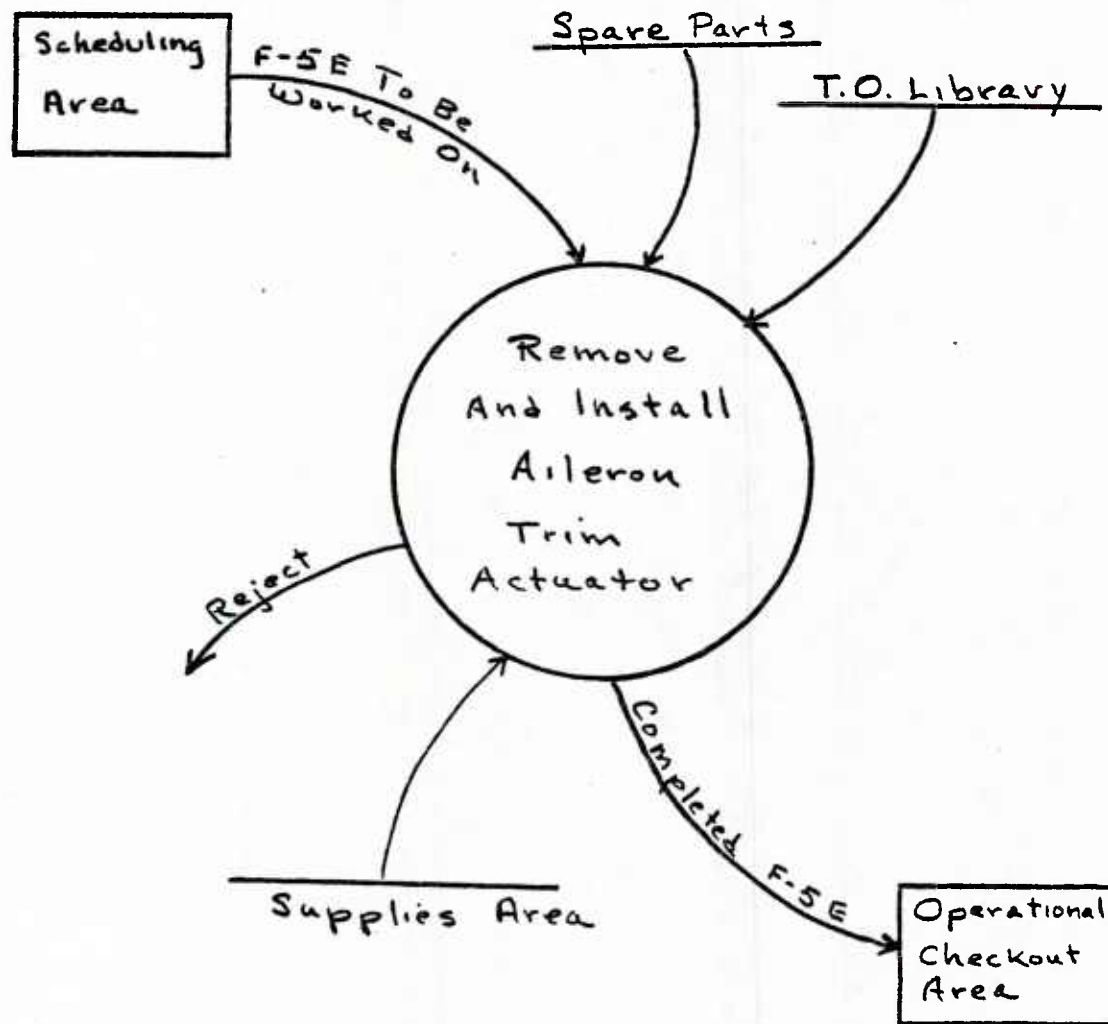
### T.O.-Library

T.O. IF-5E-2-12

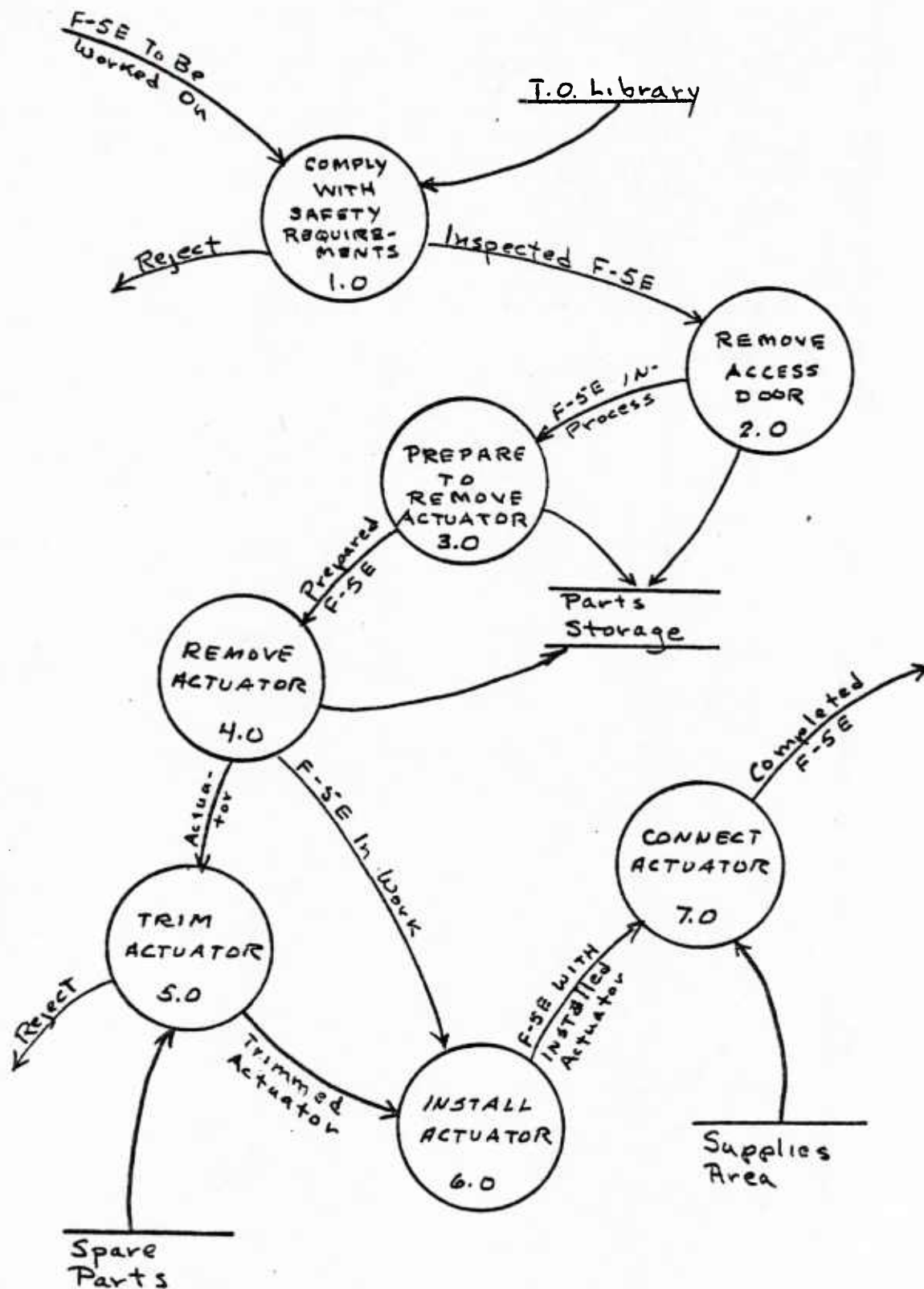
### Trimmed-Actuator

Self Defining

F-5 T.O.--Structured Controlled Version







1.0 For each F-5E-To-Be-Worked-On that you get, the Airplane General Mechanic will  
Turn off the electricity in/to the aircraft and do not turn it on again until procedure is finished  
Find out if all hydraulic systems are depressurized  
If not, send aircraft back for depressurization  
If it is, go on to next step.  
Get T.O. 1F-5E-2-12 from T.O.-Library  
Look at all safety rules  
Follow safety rules of T.O.  
(Do not go on with this procedure until all safety rules have been followed.)  
Put a warning placard on the aircraft. (Warning placard IAW T.O. 1F-5E-2-12.)  
Send on Inspected-F-5E.

2.0 For each Inspected-F-5E, the Airplane General Mechanic will:

Tell Airplane General Mechanic Assistant (Assistant) to be sure no one moves the control stick during this procedure (except as he/she is told during the Remove Actuator Process and the Install Actuator Process).

Take out the aileron control mechanism access door (See Figure 1).

Keep the bolts and door to use again. Put them in Parts-Storage.

Send on F-5E-In-Process.

T.O. 1F-5E-2-2-5-1

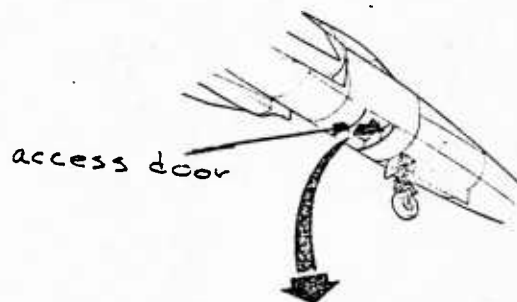
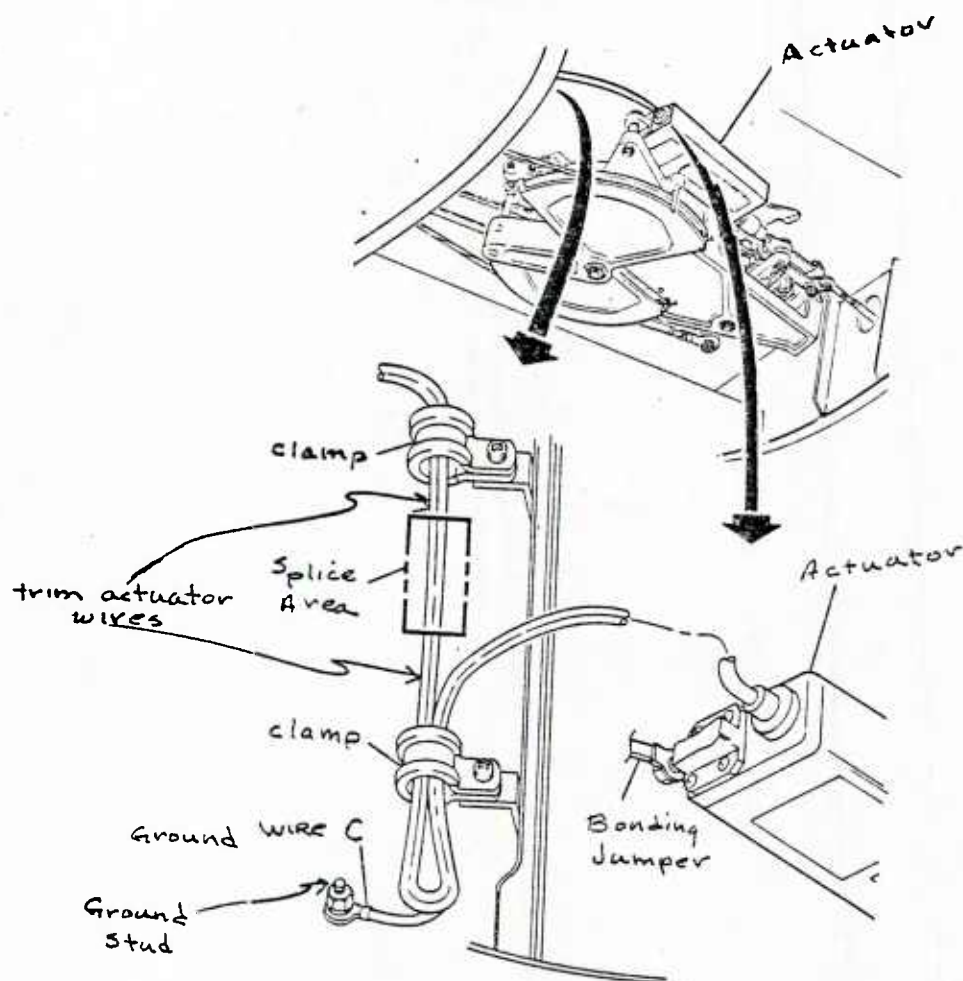


Figure 1

- 3.0 For each F-5E-In-Process the person who specifically works with electricity will (See Figure 2)  
 Remove clamps in 2 places, as shown. Fasten actuator wires to bulkhead with tape.  
 Put clamps in Parts-Storage.  
 Disconnect the 2 trim actuator wires at the splice area. Tape loose ends of wire.  
 Disconnect actuator ground wire C from ground stud. Remove terminal from wire. Throw away terminal. Tape end of the wire that is seen. Put nut in Parts-Storage.  
 Disconnect bonding jumper from Actuator. Put nut in Parts-Storage.  
 Send on Prepared-F-5E.



VIEW LOOKING AFT

F-5 JG-2-5-162(1)A

Figure 2

Change 7

9-5

4.0 For each Prepared-F-5E, the Airplane General Mechanic will (See Figure 3)  
Remove cotter pins from bolts and throw away.  
Remove nut and washer from attach bolt. Put nuts and washers in Parts-Storage.  
See if trim actuator is in neutral position.  
If not, tell Assistant to move control stick to neutral position, then go on.  
If already in neutral position, go on.  
Hold Actuator and remove the attach bolts, washers and spacers, 1 bolt at a time.  
Put bolts, washers and spacers in Parts-Storage.  
Remove Actuator from the aircraft.  
Send Actuator on.  
Send on F-5E-In-Work.

T.O. 1F-5E-2-2-5-1

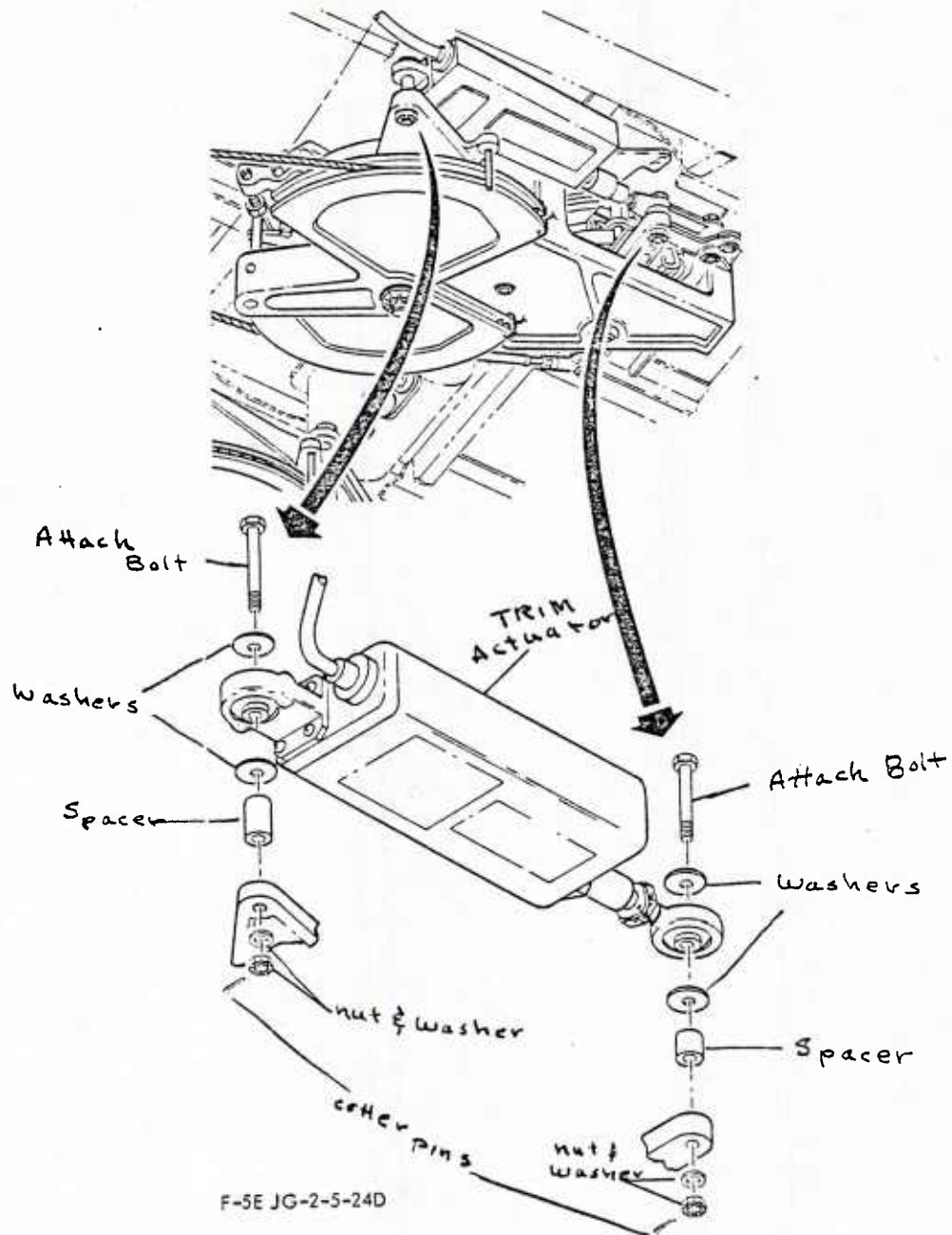
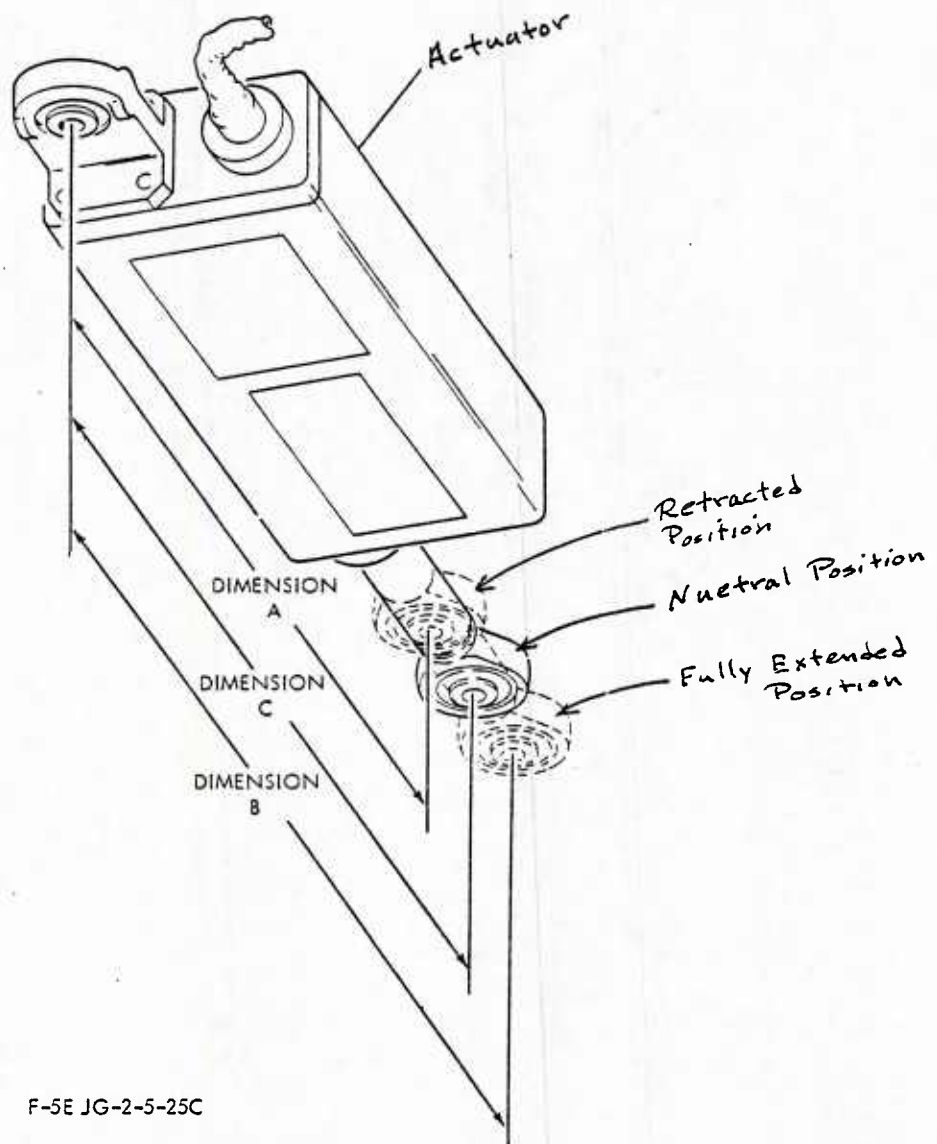


Figure 3

5.0 For each Actuator you get, the person who specifically works with electricity will (See Figure 4)  
Connect 115 volt, 400 Hz power source to trim actuator.  
Electrically position actuator at fully retracted position.  
Measure for correct adjustment. (Should equal Dimension A, at between 7.84 and 7.74 inches.)  
If in correct adjustment, go on.  
If not, send Actuator back and get a new Actuator from Spare-Parts and start this procedure again.  
Electrically position actuator at fully extended position.  
Measure for correct adjustment (Should equal Dimension B, at between 9.91 and 9.81 inches).  
If in correct adjustment go on.  
If not, send Actuator back and get a new Actuator from Spare-Parts and start this procedure again.  
Electrically position Actuator at neutral position.  
Measure for correct adjustment (Should equal Dimension C, at between 8.90 and 8.70 inches).  
If in correct adjustment go on.  
If not, send Actuator back and get a new Actuator from Spare-Parts and start this procedure again.  
Disconnect electricity.  
Send Trimmed-Actuator on.



T.O. 1F-5E-2-2-5-1

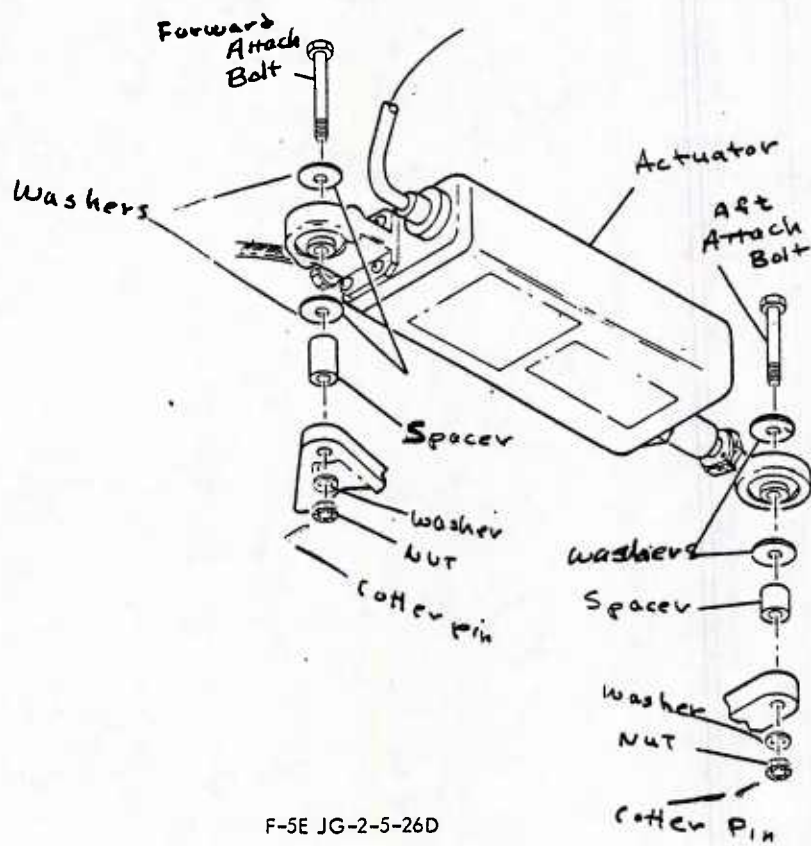


F-5E JG-2-5-25C

Figure 4



6.0 For each F-5E-In-Work and Trimmed-Actuator you get,  
the Airplane General Mechanic will (See Figure 5)  
Get attach bolts, spacers and washers from Parts-  
Storage.  
Get 2 Ms24665-69 cotter pins from Supplies-Area.  
Put Actuator in correct position and install.  
Connect bolt to rear of Actuator with washers,  
spacer and bolt, as shown in Figure 5.  
Tell Assistant to move control stick as needed to  
install forward attach bolt.  
When in position, install forward attach bolt with  
washers, spacer and bolt as shown in Figure 5.  
Install lower washers and nuts, as shown in Figure  
5.  
Attach both nuts with cotter pins (1 for each nut).  
Send F-5E-with-Installed-Actuator on.



F-5E JG-2-5-26D

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Figure 5

7.0 For each F-5E-With-Installed-Actuator, the person who works specifically with electricity will (See Figure 6)

- Get 2 Electrical Splices PN NAS 1388-1 and Electrical Terminal (need 1) PN M7928/1-15 from Supplies-Area.
- Get ground stud nut, bonding jumper nut, clamps and clamp nuts from Parts-Storage.
- Find correct wires.
- With Electrical Splices, at Splice Area 4B1WT1, splice trim Actuator wire B to aircraft wire C2B20 and Actuator wire A to aircraft wire C3B20.
- Remove tape from Actuator wire C.
- Install Electrical Terminal, PN M7928/1-15 on the actuator wire.
- Connect to Ground Stud with nut from Parts-Storage.
- Connect bonding jumper to Actuator with bonding jumper nut from Parts-Storage.
- Fasten Actuator wires to bulkhead with clamps (2) and clamp nuts obtained from Parts-Storage.
- The Airplane general mechanic will get The Access Door and installation bolts from Parts-Storage.
- Install the Access Door with the installation bolts.
- Check that all the above steps have been done.
- Send Completed-F-5E to Operational Checkout Area.
- Notice: The aircraft will not be released from Maintenance until it is sent through the Operational Checkout Area.

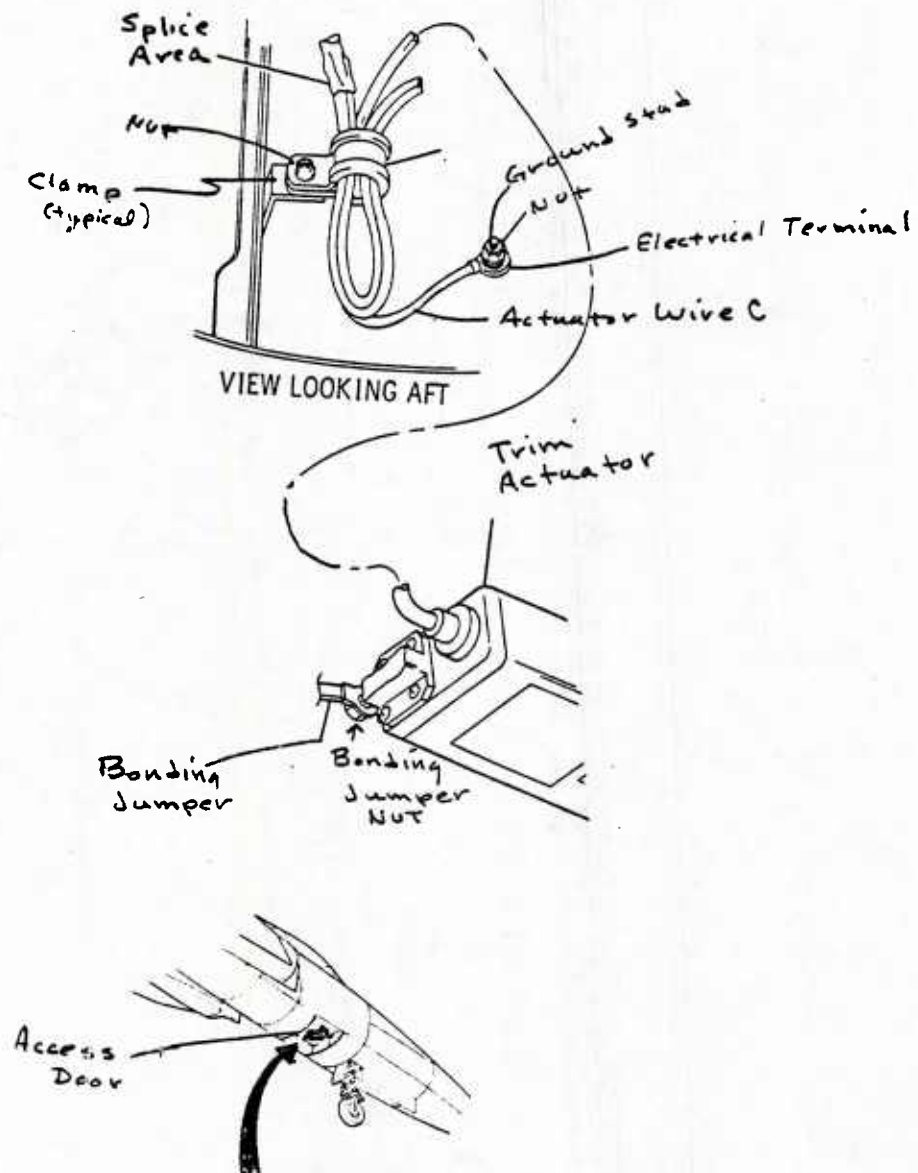


Figure 6

## DICTIONARY

### Actuator

F-5E Actuator

### Aileron-Trim-Actuator

Aircraft Part, self defining

### Completed-F-5E

F-5E with Installed Actuator plus  
Access Door

### F-5E-In-Process

F-5E to be worked on minus  
Access Door and Bolts

### F-5E-In-Work

F-5E in Process minus  
Actuator

### F-5E-To-Be-Worked-On

Self Defining

### F-5E-With-Installed-Actuator

F-5E in work plus  
Trimmed Actuator

### Inspected F-5E

F-5E to be worked on plus  
Necessary placards

## DICTIONARY CONT'D

### Parts-Storage

(Any Temporary Storage for parts removed from the F-5E in this procedure. Parts will be used to reinstall equipment.)

Clamps plus  
Nuts plus  
Washers plus  
Spacers  
Access Door

### Prepared-F-5E

Self Defining

### Spare-Parts

New Actuator

### Supplies-Area

Electrical splice, PN NAS 1388-1 plus  
Electrical terminal, PN M7928/1-15 plus  
Cotter Pin, PN MS24665-69

### T.O.-Library

T.O. IF-5E-2-12

### Trimmed-Actuator

Self Defining

APPENDIX D  
TESTS

## TEST INSTRUCTIONS

This test consists of 3 parts.

Part 1 is background information to help us analyze the test. Complete this portion now.

Part 2 consists of the 4 types of documents we are testing. When you take this portion of the test, follow the guidelines below that apply to that type of document.

1. Document 1 will be in standard English.
  - a. Read the document.
  - b. Find definitions (if present) in the text.
  - c. Look at figures/pictures when the English text refers to them.
2. Document 2 will be in controlled English. This is a simplified version of standard English. The same procedure should be followed as for Document 1.
3. Documents 3 and 4 are "Structured" Documents.
  - a. Look at and read the top Data Flow Diagram (Top chart).
  - b. Find definitions of terms in the Dictionary.
  - c. Look at and read the "detail" Data Flow Diagrams, "top-down." Identify which top process they refer to by the number of the process.
  - d. Repeat "b" if necessary.
  - e. When a process has no further detail charts, identify and read the "mini-spec" for that process (they have the same I.D. number).
  - f. Repeat "b" if necessary.
  - g. Look at any pictures/figures when the "mini-spec" refers to it.

After reading the document, proceed to answer the questions. You may refer to the document to find the answers. When you begin the test on each type of document, write the time you start reading, the time you stop reading, the time you complete the questions, for that document.

Each document will have a maximum time alloaed. If you finish before that time, DO NOT CONTINUE!

To answer on your answer sheet, write the number of the question and the letter of the answer e.g., 2. a.

Part 3 is a simple ranking--We will do this at the end of the test.

Remember--We are testing the documents - NOT YOU. Total correct answers will be the basis for our evaluation. Please DO NOT just guess to answer all the questions as this will invalidate the whole purpose of this test. THANKYOU!



PART 1 BACKGROUND INFORMATION

CIRCLE THE ANSWER THAT APPLIES

1. My native language is

English

Not English

IF YOUR NATIVE LANGUAGE IS ENGLISH,

SKIP THE NEXT 3 QUESTIONS.

2. I have been using the English Language for (any purpose)

1 year

2-4 years

5-10 years

Over 10 years

3. I studied English in school

1 year ago

5-10 years ago

2-4 years ago

I never had a special class

4. I have been in the United States (total)

Less than 1 year total

2-3 years total

1-2 years, total

Over 3 years total

5. I have worked in the logistics field

Less than 1 year

2-4 years

1-2 years

4-5 years

Over 5 years

6. My Logistics Experience is mainly in:

Maintenance

Transportation

Storage

Requirements

Engineering

Acquisition/Procurement/Contracts

Technical Documentation

Automated Systems

Other - Please specify.

## ANSWER SHEET

NOTE: Participants were asked to write their answers (i.e., the question number and their answer) and any comments they wished to make, on a blank sheet of paper (provided) in any order they wished.

7. What time is it? Write the time as the answer to number 7 and then proceed to read the document.

NOTE: Questions were attached to each test document in booklet form. The first page contained only the time question and the direction to proceed. Then came the document being tested and then the multiple choice questions. Thus the pages with Questions 7, 22, 37, and 52 contain only the time question and the instruction.

8. What time is it? Write the time as the answer to number 8 and then answer the rest of the questions.
9. Document identifier AM1 is used to:
- A. Raise or lower the priority designator.
  - B. Request an improved estimated shipping date.
  - C. Cancel a requisition.
  - D. More than one of the above.
  - E. None of the above.
10. Priority designator code on documents with AM1, AM4 or AM5 Document Identifiers can be used to:
- A. Raise a priority designator.
  - B. Lower a priority designator.
  - C. Raise or lower a priority designator.
  - D. Priority designator can not be changed once the requisition is submitted.
11. Document identifier AC2 is used for:
- A. Cancellation of total quantity on a previously submitted requisition.
  - B. Follow-up a previously submitted cancellation.
  - C. Change in quantity to an increase from the original requisition.
  - D. A and B.
  - E. B and C.
12. A cancellation may be:
- A. Coded AF2.
  - B. Coded AK2.
  - C. Coded AC2.
  - D. Either A or B.
  - E. Either B or C.
13. Contract Status (DIC AF2) has been received for a document transmitted by AUTODIN. Follow-up may be submitted only after expiration of:
- A. ESD + 60 days + mailing time.
  - B. ESD + 60 days.
  - C. ESD + mailing time.
  - D. ESD.
14. Cancellation requests by customers should be done by:
- A. Mail.
  - B. AUTODIN.
  - C. Message (DD Form 173).
  - D. All of the above are acceptable.
  - E. B and C only.

15. An AFC follow-up may not be used after receipt of:
- A. Status BA.
  - B. Status BV.
  - C. Status BL but only for priority 01-08 documents.
  - D. Shipment Status.
  - E. Supply Status.
16. A MILSTRIP cancellation may be requested by:
- A. DD Form 1348.
  - B. DD Form 173.
  - C. Letter Format.
  - D. All of the above.
  - E. A and B only.
17. When a follow-up is authorized at the expiration of ESD plus 60 days for a contract status condition, and the type of follow-up is AF2, then the priority designator must be:
- A. Ø1-15
  - B. Ø9-15
  - C. Ø1-Ø8
  - D. Any of the above.
  - E. None of the above, AF2 follow-up not authorized for this purpose.
18. Customer country "X" had previously submitted a requisition for quantity 10 of item "Z." Prior to receiving the item it finds that now it needs quantity 25 instead of 10. He should:
- A. Cancel the requisition for 10 and put in a new requisition for 25.
  - B. Add 15 to the previous requisition.
  - C. Submit a modifier for the 10 and submit a new requisition for 15.
  - D. Any of the above is acceptable.
19. What is your judgment of the author's competence as a writer? Assign a rank of from 1 (very low competence) to 9 (very high competence). Write your assigned rank as the answer to number 19.
20. What is your judgment of the author's knowledge of thisa subject matter? Assign a rank of from 1 (very little knowledge) to 9 (very complete knowledge). Write your assigned rank as the answer to question 20.
21. What time is it? Write the time as the answer to this question, number 21.

22. What time is it? Write the time as the answer to number 22 and then proceed to read the document.

23. What time is it? Write the time as the answer to number 23 and then answer the rest of the questions.
24. If the DD Form 1513 does not state the dollar value/limit a claim must equal or exceed, then:
- A. It will be judged on a case by case basis.
  - B. Any claim is valid.
  - C. Claim must exceed \$200.00.
  - D. Regulated by DoD 4000.25M.
  - E. None of the above.
25. Items 1 through 15 on the SF 364 are:
- A. Optional for FMS purchasers.
  - B. General guidance to the DoD ICP/IM on what the DoD ICP/IM will find on the SF 364.
  - C. What the FMS purchaser is to include on the SF 364.
  - D. A and B.
  - E. B and C.
26. When an SF 364 from an FMS customer is received, SAAC will:
- A. Place the billing in suspense (temporary hold), when proper.
  - B. Not change the billing unless the ILCO directs a change (including temporary holds).
  - C. Reject the SF 364 if the complete reverse of SF 364 is not properly completed.
  - D. A and C.
  - E. B and C.
27. An FMS country takes custody of an item on 15 June '80. The billing for that item is dated 1 July '80. Final date to submit SF 364 is (without special justification)
- A. 15 June '81.
  - B. 30 June '81.
  - C. Within 75 calendar days from receipt of 1st reply from the ILCO.
  - D. None of the above.
28. The SAAC serves as Liason between:
- A. The FMS country and the DoD ICP/IM.
  - B. The DoD ICP/IM and GSA.
  - C. FMS country and the State Department.
  - D. FMS country and the ILCO.
  - E. The ILCO and the DoD ICP/IM and the GSA.
29. The ILCO has 15 days to:
- A. Send SF 364s received from SAAC to the Action Agency.
  - B. Send SF 364 answers from the DoD ICP/IM to SAAC.
  - C. Submit SF 364s from date of receipt from the FMS purchaser.
  - D. A and C.
  - E. A and B.

30. SAAC will reject SF 364s (Discrepancy Reports) which:
- A. Lack needed data that are readily available at SAAC.
  - B. Are above the dollar limitation contained in DD Form 1513 or any other sales agreement with FMS purchaser.
  - C. Are duplicate and not resubmitted to contest a previous decision.
  - D. None of the above.
31. When the SAAC receives a duplicate SF 364:
- A. It will be rejected.
  - B. The FMS customer will be contacted for an explanation.
  - C. It means the dollar amount has not been correctly adjusted on the FMS account.
  - D. Like an AF2 MILSTRIP follow-up, it will be researched as indicating the FMS country received no status reply on the original submission.
  - E. Unless accompanied by a protest, it will be rejected.
32. Replies to SF 364 will be sent to the FMS country from:
- A. SAAC within 15 calendar days.
  - B. DoD ICP/IM or GSA within 75 calendar days.
  - C. ILCO within 15 calendar days from date of receipt from the DoD ICP/IM or GSA.
  - D. SAAC with first available monthly statement of transactions issued after receipt of SF 364 from the ILCO.
33. When the DoD ICP/IM or GSA cannot answer the SF 364 in the required time, they should:
- A. Contact SAAC and request an extension.
  - B. Inform the FMS customer and provide the ILCO with justification.
  - C. Request a 75 day extension from the ILCO.
  - D. A and B.
  - E. None of the above.
34. What is your judgment of the author's competence as a writer? Assign a rank of from 1 (very low competence) to 9 (very high competence). Write your assigned rank as the answer to number 34.
35. What is your judgment of the author's knowledge of this subject matter? Assign a rank of from 1 (very little knowledge) to 9 (very complete knowledge). Write your assigned rank as the answer to question 35.
36. What time is it? Write the time as the answer to this question, number 36.



37. What time is it? Write the time as the answer to number 37 and then proceed to read the document.

38. What time is it? Write the time as the answer to number 38 and then answer the rest of the questions.
39. RIW items can be identified by:
- A. Project number 390.
  - B. PACER WARRANT nickname.
  - C. T.O. 00-35D-54.
  - D. A and B.
  - E. A, B, and C.
40. SM/IM actions to determine disposition of RIW items includes:
- A. Determining if the local base can repair the item.
  - B. Review of the contract with the Production Management Branch.
  - C. Request for advice from PCO.
  - D. All of the above.
41. If the item is critical and will be repaired locally, the SM/IM should be furnished with:
- A. A message telling what was done.
  - B. Disposition instructions for the item.
  - C. The NSN, the contract number, the part number, defect data and SF 368 data.
  - D. T.O. 00-25-115 or Chapter 2, Part 2 data.
  - E. A request for disposition instructions.
42. The base (originating) must be notified of final Disposition Instructions by the SM/IM within:
- A. A period no more than 30 days from receipt of request for disposition instructions by SM/IM.
  - B. A maximum period of 30 days from dispatch of item to the SM/IM.
  - C. 7 calendar days of receipt of request for s disposition instructions.
  - D. 7 days from decision of the PCO/ACO.
  - E. None of the above.
43. (MMEA) should be informed of:
- A. All reports and final disposition actions of SM/IM.
  - B. All actions related to quality deficiencies pertaining to warranted items.
  - C. All PCO/ACO actions, only on items on contract.
  - D. A and C.
  - E. B and C.
44. An item under warranty can be repaired locally if:
- A. SM/IM approves such repair.
  - B. It is an RIW item.
  - C. Item is authorized for field level repair, in short supply, and mission essential.
  - D. If the AFTO Form 350 from Maintenance authorizes local repair.
  - E. A and B.

45. DD Form 1575 is used for:
- A. Warranted items to be repaired.
  - B. Items that have already been disposed of.
  - C. Non-warranted items that require disposal instructions.
  - D. Warranted items that require disposal instructions.
  - E. Any of the above, it is a general purpose toy.
46. Mission essential, critical items needed for mission capability are:
- A. Listed in T.O. 00-35D-54.
  - B. Listed in PACER WARRANT T.O.s.
  - C. Authorized for local repair.
  - D. A and C.
  - E. B and C.
47. PACER WARRANT applies to:
- A. All warranted items.
  - B. Items subject to reporting of quality deficiency.
  - C. Items subject to quality deficiency report SF 368.
  - D. RIW items.
  - E. A and B.
48. RIW Material handling will be according to:
- A. The equipment technical order.
  - B. Normal supply procedures.
  - C. Manufacturer's instructions.
  - D. B unless A contains other instructions.
  - E. T.O. 00-25-115.
49. What is your judgment of the author's competence as a writer? Assign a rank of from 1 (very low competence) to 9 (very high competence). Write your assigned rank as the answer to number 49.
50. What is your judgment of the author's knowledge of this subject matter? Assign a rank of from 1 (very little knowledge) to 9 (very complete knowledge). Write your assigned rank as the answer to question 50.
51. What time is it? Write the time as the answer to this question, number 51.

52. What time is it? Write the time as the answer to number 52 and then proceed to read the document.

53. What time is it? Write the time as the answer to number 53 and then answer the rest of the questions.
54. Cotter pins should:
- A. Not be retained after removal.
  - B. Not be removed.
  - C. Be retained for reinstallation.
  - D. None of the above.
55. For removal, the trim actuator should be:
- A. Removed by the assistant.
  - B. In neutral position.
  - C. In any position other than neutral.
  - D. Removed with control sticks.
  - E. A and C.
56. Actuator ground wires should be:
- A. Disconnected from actuator.
  - B. Disconnected by removing the splice.
  - C. Disconnected from the ground stud.
  - D. Disconnected from the aircraft in 2 places, at each clamp.
57. Neutral length is:
- A. Dimension A.
  - B. Dimension B.
  - C. 8.7 - 8.9 inches.
  - D.  $7.79 \pm 0.05$  inches.
  - E. None of the above.
58. When installing actuator, it should be:
- A. In neutral position.
  - B. At fully retracted position.
  - C. At fully extended position.
  - D. B or C.
  - E. B and C.
59. If the actuator does not meet stated trim dimensions:
- A. Proceed, the numbers are for information only.
  - B. Obtain a new actuator.
  - C. Repair the actuator by adjusting trim length through adjustment of the attach bolts.
  - D. Dimension will always meet required distances.
  - E. None of the above.
60. T.O. 1F-5E-2-12 should be used for:
- A. Safety procedures needed to depressurize the hydraulic system.
  - B. Instructions for removal and installation of aileron trim actuator.
  - C. Recommended warning placard design.
  - D. A and C.
  - E. A, B, and C.

61. During installation of the actuator, the assistant:
- A. Will help by disconnecting the actuator wiring.
  - B. Will make sure no one is accidentally moving the control stick.
  - C. Is to assist the electrical specialist.
  - D. Will move the control stick when the electrical specialist says to.
  - E. A and C.
62. This procedure:
- A. Requires that the hydraulic system be pressurized.
  - B. Requires both hydraulic systems to be depressurized.
  - C. Requires that a warning placard should always be placed conspicuously on the control being worked on.
  - D. Requires electrical power to be used in the aircraft to adjust the trim actuator to fully extended position.
  - E. C and D.
63. Connection of trim actuator wiring will be done:
- A. After installation of attach bolts.
  - B. Before installation of attach bolts.
  - C. During installation of attach bolts.
  - D. Before removing access door.
  - E. A and D.
64. What is your judgment of the author's competence as a writer? Assign a rank of from 1 (very low competence) to 9 (very high competence). Write your assigned rank as the answer to number 64.
65. What is your judgment of the author's knowledge of this subject matter? Assign a rank of from 1 (very little knowledge) to 9 (very complete knowledge). Write your assigned rank as the answer to question 65.
66. What time is it? Write the time as the answer to this question, number 66.

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